40p EVERY WEEK · No 106 · APRIL 6 1985

PERSONAL Computer NEWS

FREE COMPETITION £1,000 in prizes

ATARI BANDWAGON ROLLS

GEM AND ST LURE SOFTWARE SUPPORT - P.2

64 & ATARI DISK AIDS

BASIC OF THE FUTURE

MEMOTECH ASSEMBLER

FREE SPECTRUM UTILITY

Super Gran

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This great new game is based on the Tyne Tees series Super Gran and produced in association with Tyne Tees Television. Super Gran will be available for the CBM 64, Spectrum 48K, C16 and Amstrad on April 2nd with versions for the BBC/B Electron, MSX, Atari and Einstein to follow.

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MENU

First the good news, a happy Easter to all of you. The bad news is you'll have to live without us for a week. Because of the problems caused by the Bank Holiday weekend we've had to drop next week's issue. Anyway, why shouldn't we have a holiday too? To compensate we've made this issue a bit bigger, and issue 107 will be worth the wait. We'll have a special feature on printers, and we'll show you how to build a printer interface for your 64, plus a great Spectrum competition. So don't miss it.

COVER STORY

ATARI bandwagon rolls 2

The new 16-bit Atari machines look set to put Atari back in the big league. We report the latest details on the machines, with a special look at the GEM operating system, and reveal the groundswell of support that's already building.

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All right, Memotech owners — we've put our money where our mouth is and come up with a superb feature on MTX code. If you want to learn machine assembler, this is for you.

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We're giving away two Penman plotters and runners-up prizes worth a total of £1,000 in this free, easy-to-enter competition. Have a go . . .

REGULARS

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MONITOR

Argus cracks whip on Quicksilva

Argus Press Software is clipping Quicksilva's wings prior to spreading its own. The group plans new titles, new styles, and ultimately a rebirth of the Game Lords — this time on its own terms.

Against a background of bickering, Argus is moving the Quicksilva operation from Southampton to London. It may be that as few as three or four Quicksilva people will move with it, but Argus' aim is to set up a fresh marketing team and rejuvenate the Game Lords with its own hand on the joystick.

Peter Holme, as of this week in charge of Quicksilva marketing, said from Argus: 'We're just picking up the pieces. But it's a marketing man's delight — we've got several products coming along that are real humdingers.'

The view at Argus is that it left Quicksilva to its own devices for too long. 'The reality is that sales just haven't been there,' said Holme. 'Quicksilva ought to be number one and it hasn't been. But it will be the best again. We're working with the Quicksilva people who are staying on and we'll relaunch the Game Lords. I want to see Game Lord conventions, competitions within games to become Game Lords, all the sorts of things that people get off on.'

Quicksilva itself has been incommunicado for days, and rumours that Rod Cousens will not move to London haven't been confirmed. Holme said: 'I hope Rod stays with it because he's a terrific personality.'

He denied point blank that Argus had any plans to contract Quicksilva, and on all other fronts the group is expanding. Its tie-ups with Lothlorien and Starcade are both bearing fruit and it is moving ahead in other directions, principally useful home software.

At the end of April it plans to launch its Home Activity Centre, two integrated programs for the Commodore 64. For £19.95 there will be a word processor/database/spreadsheet package, and for £14.95 a word processor/animator/composer suite. These may also be converted for Atari systems.

From Lothlorien, around the same time, it will release a simulation of the Battle of Arnhem, complete with elements of arcade action and a war-gaming handbook.

There is also a range of educational software under development.

But Argus is still looking to Quicksilva to provide 50 per cent of its turnover in the software business, and it is looking for home-grown talent to provide the raw material.

Quicksilva — Game Lords disarmed.

The law hits back against hackers

The backlash against hackers starts this morning (Wednesday) in Bow Street magistrates court, where two men face charges arising out of hacks on Prestel.

Robert Schifreen and Steven Gold have been charged under section one of the 1981 Forgery and Counterfeiting Act. The offences they are alleged to have committed involve access to Prestel computers between November last year and February this year.

Schifreen used to be Bug Hunter in Computer and Video Games; Gold put together a column on Micronet. They are now described as a technical author and an accountant respectively.

The forces of reaction seem to be gathering to turn back a tide of hacking. The case of Schifreen and Gold comes hard on the heels of the slightly hysterical response that has arisen in some quarters to the publication of *The Hacker's Handbook* (issues 104 and 105).

The Act under which the pair are charged focuses on the 'forgery' of computer disks and 'electronic devices' for recording information from Prestel computers and services — the Gateway test facility is mentioned specifically.

This means that the law can be used against anybody trying to delude Prestel into thinking it is talking to an authorised user — it is the protocol that is being 'forged', not anything as simple as a floppy disk.

DR launches a GEM of a Mac attack

Digital Research's own personal Mac attack, GEM (Graphics Environment Manager), is about to fire the first shots in a personal computing revolution.

GEM Desktop, a Macintosh look-alike, with PC/MSDOS front-end will be available from April 15 for £49.95. GEM Draw, a cut-down version of MacPaint, will be released on the same date at an introductory price of £129.95, rising to £229.95 after August 1. Other applications, are to follow in summer.

The GEM collection, GEM Write, GEM Paint and GEM Desktop will be launched as a package on June 15 at £129.95, to be followed by GEM Graph (£179.95) and GEM Wordchart (£129.95) on July 1.

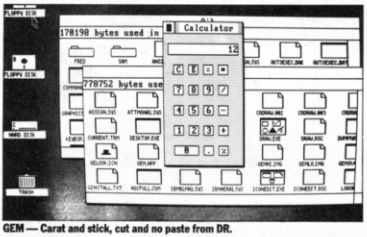
DR has licensed GEM to ACT, and Atari's ST will feature GEM in ROM. Since the GEM products released only run on the IBM PC, XT or AT, PC-compatible micro makers will be under pressure to launch GEM-running machines. Commodore, Sinclair and others will feel the pinch, too.

Digital Research claims that many software houses are coding GEM applications for release in the immediate future and more than 200 GEM programmer's toolkits have been sold. DR is deliberately keeping prices down to encourage third party software vendors to do likewise.

GEM on a standard IBM PC is rather slow but 68000 versions, or GEM on hard disk, are much faster, and GEM can handle 16 colours. The colour support and GEM's portability might spell trouble for the Mac, but DR faces the difficulty of producing a host of data files to allow end users to tailor GEM to their particular system.

Moreover, GEM feels like a precursor to the Lisa and Mac systems, not a development — several features are missing and GEM Draw isn't a patch on MacPaint.

But if DR can sign up more OEMs, like Atari, we'll see lots of Mac look-alike systems and software by the end of the year.



GEM — Carat and stick, cut and no paste from DR.

Tramiel leads charge in Atari revival

Jack Tramiel is poised to do what many would have declared impossible — take the corpse-like Atari and turn it into one of 1985's hottest computer companies. The machine that will do it is Atari's ST.

The 68000-based ST is a child of first-class pedigree — born of Atari's engineers, Tramiel's swashbuckling marketing style, and Digital Research which provided it with one of its outstanding features, the GEM desktop environment.

Reaction in the US is very favourable, especially in the light of Atari's position last year — dead on its feet after an onslaught from Tramiel's Commodore.

Richard Frick, product manager of the ST range at Atari's US headquarters, revealed the level of support growing for his machines. To date 38 development systems have been sold and there are orders for another 75.

More impressive is the list of software companies working on ST products. Heading the roll is Microsoft which has produced much of the best software for the Macintosh including the superlative MS-Basic 2, Word, Chart and Multiplan. Frick says Microsoft will convert its range of Mac software to take advantage of the ST's colour display.

Atari is working on a number of businesslike programs and will probably produce two of each — an entry-level version and a full-featured version.

But it's not all work and no play. Several of America's top games companies have taken the ST to their hearts. Among them are Sublogic, renowned producer of flight simulators; Spinnaker, one of the leading education software houses; graphics specialist Penguin Software; and Microprose, several of whose games have been brought to Britain by US Gold.

Last but not least, adventure king Infocom said: 'We intend to have the whole of our product line available for the ST at launch.'

In Britain, GEM gets a muted thumbs up from software houses. They're waiting to see how GEM sells, if Atari can deliver the goods, and how the machine is received.

Some British software houses are already coding applications for GEM.

Lotus has still to release Jazz on the Macintosh and a spokesman said: 'There are no plans to produce software for GEM'.

Thorn-EMI's UK offices were non-committal over plans for GEM, but the company is 'very interested' in Atari's ST. In fact its first GEM product will be for the ST. This will be conversions of the company's Perfect range of software from its American arm, Thorn-EMI Inc.

Compsoft, publisher of Delta and Domino, is currently using GEM in-house. A spokesman said: 'Nothing else provides as much help to the programmer', and added that a couple of pieces of GEM compatible software should be available this year.

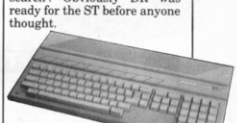
Even in the US there are one or two dissenting voices, largely favouring Commodore's 16-bit Amiga machine over the ST. Broderbund said it was converting several titles for the Amiga but had no plans for ST software.

Electronic Arts, publisher of Archon, MULE and One-on-One, said some titles would be available for the ST but 'the main thrust of our hardware support this year will be for the Amiga.'

Many observers anticipate a battle royal between the two but the signs seem to favour Atari at the moment. Scheduling for deliveries of the Amiga is open to question (see story on facing page) whereas Atari looks on target to start shipping machines at the end of April.

Atari's critics — Sir Clive Sinclair among them — didn't believe the company could produce the hardware on time, or that Digital Research could implement GEM on the 68000 this soon.

DR, however, took a neat shortcut by hooking GEM onto CP/M-68K which has been available for some time. When the ST was announced much was made of the Tramiel Operating System, but tucked away in the small print of the brochure is the line 'TOS is a trademark of Digital Research'. Obviously DR was ready for the ST before anyone thought.



Atari 520ST — first GEM vehicle.

Better and beta — first impressions

PCN currently has a beta test version of GEM running on an IBM PC, and it's limited both by the geriatric nature of the PC's 8088 processor and by the fact that it's currently a front-end with little in the way of back-end, but for all that it's still fun to use.

Once applications software incorporating GEM is available it stands a fighting chance of transforming serious computing into something that's easy to learn. The version running on the Atari 68000 machines will have the additional advantage of leaving the PC version standing.

The minimum GEM will do is to present you with a more user-friendly 'desktop' style opening screen, showing trash can, files, clock, calculator and so on. Use your mouse to point at a 'disk' on the screen and you get a directory, then point at a program on the directory and it runs.

Currently, as there's no software that uses GEM's facilities, you then drop into the program and you don't see GEM again until you exit it, but still have the opportunity to marvel at the way your 'desktop' is exactly the way it was when you left it, and it's still possible to play with GEM Draw, which although not a patch on MacPaint is a lot more fun than weary old Wordstar.

Watch this space for the full story, when *PCN* will reveal whether or not you can get cheesed off with mice . . .

MONITOR

Welcome Amiga and goodbye Plus/4?

Commodore's Amiga, on course for a summer launch, is attracting some heavyweight software support — but it's one of the few bright spots on Commodore's horizon at the moment.

The C16 and the Plus/4 are teetering under the weight of fierce price cuts; the LCD, on view in Las Vegas in January (issue 95), is 'on ice' for an indefinite period; and the word is that the 64 will have to give a little to make room for the 128 when it arrives.

The Amiga was the scene-stealer at 1984's Consumer Electronics Show and it is expected to give Atari's STs and several other mid-range machines a run for their money. 'At about $1,000 it can't strictly speaking be described as a consumer product,' said a spokesman, adding that the system would be equipped with 'excellent applications for business users'. But the Amiga's main appeal could prove to be its graphics, in whatever type of applications.

Meanwhile Commodore's latest launches, the C16 and the Plus/4, are feeling the chill wind of market forces. 'The C16 is being murdered by the high street,' claims Commodore in a reference to leap-frogging price cuts that have seen it come down to £70. It confirmed that it couldn't continue to support the system at that price, but the spokesman stressed: 'No decision has been taken by the company to drop the C16 or the Plus/4.'

The C16 has been attracting greater software support recently but there are no such compensations for the Plus/4. The 50 per cent price cut of two months ago (issue 99) hasn't built any confidence in the long-term future of the system, which at £150 is hardly a competitor for the 64.

The 64 looks due for a price cut of its own — and the retailers are gradually moving it in the right direction. If the C128 is to make any kind of a splash, Commodore has to put the 64 in the position tenaciously held by the Vic 20.

3-2-1 hits the mail on the head

That truly wonderful and very popular television game, *3-2-1* is now available for the Spectrum. But don't all rush out at once. It won't be sold over the counter — one of the 'innovative and exciting new features' is that distribution will be mail order only.

The three-piece suite features an 'imaginative, animated, real-time action game'. The first section is a question and answer affair, the final part involving accepting or rejecting items, which determines the prize to be won. The package also features a truly amazing voice-over from that very special human being, none other than Ted Rogers himself.

Return your registration card for the chance of a week for two in sunny Spain, a colour television, bicycle, food processor, Microvitec monitor, Trojan Light Pen, or games from Virgin and New Generation.

Publisher, Micro Computer Incorporated, hopes to release a second version of this novel and truly outstanding software later this year. Pass the sick bag, Alice.

PC PLUS — Commodore has jumped aboard the bandwagon and produced two IBM compatible machines. It doesn't claim 100 per cent compatibility, only that the hundreds of programs it has tried ran without any problems. Both machines are built around the 8088 16-bit processor and have 256K RAM expandable to 640K. The PC 10, priced at £1,675, comes with two 5.25in disk drives while the PC 20 has one 5.25in disk and a 10 Mb hard disk. Priced at only £2,795 this is probably the cheapest hard disk PC compatible machine on the market. The machines should be arriving at Commodore dealers now.

VIEW FROM JAPAN

Comdex Japan — is it coals to Newcastle?

It's a well-known fact that you can't sell to the Japanese unless you make luxury cars or high-octane whisky. In all other products they'll flood your own domestic markets and keep their own tightly protected.

This well-known fact is much resented in boardrooms throughout Tokyo, but somehow the occasional pictures of earnest Japanese business executives listening to would-be exporters never dispel the first impression. Can it be something to do with inscrutability? They listen attentively but their thoughts seem to be their own — unlike their western counterparts (eastern from our point of view, of course) who listen noisily and clap their visitors on the back.

Two events are taking place in Japan at the moment that should help to pursuade the Americans and Europeans that our doors aren't so firmly closed after all.

One of these is the first appearance of Comdex. From humble beginnings Comdex has grown into a series of shows at various points on the globe. With a suitable diary management program you could probably arrange to be at a Comdex show every working day of the year. There are Comdex shows winter, spring and fall, Comdex/Europe, and now Comdex/Japan.

Not such a big deal? Well, advance registrations reached a peak of 4,000 a day — even the US original only draws 1,000 a day. The organiser, the Interface Group, expected 10,000 and has steadily revised that upwards to 40 or 50K. Most of the registrants are Japanese but there are also Koreans, Taiwanese, and people from Hong Kong and Singapore.

It isn't that Tokyo is starved of trade shows. They are as frequent and as bustling here as anywhere else — Hannover in the spring, Paris in September, Las Vegas all year round. The difference seems to be that the regular events are being seen as parochial by the show-going public. Comdex has an international flavour that has tempted the jaded palates of the local gourmets. That in itself should hold a lesson for importers.

Japan Inc is not likely to be overwhelmed by US exhibitors at Comdex/Japan. The American exhibition contingent will number 30 companies, joining 170 from Japan and Asia. At the concurrent conference Atsuyoshi Ouchi of NEC will talk about 'Japan and Asia — New Horizons for Small Computers'. It will be surprising if concurrency isn't a prominent thread running through the conference, but it will be in a distinctly Asian context. But the common denominator could be ordinary currency, as in the prospects for making large amounts of yen.

Already assured of substantial yen earnings is the Dutch multinational Philips, which has succeeded in convincing at least one Japanese giant that European know-how is ahead of the local variety. Philips has set out on a joint venture with Kyocera to sell its office communications products in Japan.

Kyocera is the outfit that supplied NEC, Tandy and Olivetti with their first lap-held micros. It also finds innovative uses for ceramics — in internal combustion engines, for example — but it hasn't before sought to challenge the likes of NEC, the motto of which is 'computers and communications', at this level.

The particular Philips production concerned will be from the Sopho-Net range. Known elsewhere as Sophomation, this sleepy-sounding line of kit runs from typewriters to communicating micros with all sorts of intermediate stations — remote controlled dictation systems, self-service banking systems, telephones and other items.

The joint venture's name will lack originality — they plan to call the company Kyocera and Philips Communication Network. Sopho-Net will probably make the trip intact as well, but on its way it will lose the European connotation of wisdom (sophos, a Greek word for wise) and pick up an altogether unwanted nuance — sophy, an ancient word for the Shah of Persia.

The main point is that it should succeed. This should spur other western suppliers on; it must eventually be discovered that Japan, technology-driven, is as prone as anybody to look for the best, wherever it comes from. The lesson of successful importers in Japan is that they supply goods or services of a quality that the Japanese can't do for themselves. There's no reason on earth why that shouldn't apply to computer equipment.

Or to computer trade shows, for that matter. ***Stomu Ng***

MONITOR

Apple Turnovers are just the business

The Apple/IBM battle for office supremacy is spilling over into the UK, where an independent supplier has declared it a draw with a novel piece of equipment.

Systems Constructors (0202-297315) has released a board called Turnover. Users of PCs or closely compatible alternatives will be able to fit the board into one of the IBM's slots and their drives will read Apple disks.

Apple Turnover, with supporting software and an instruction manual, translates Apple DOS 3.3 and Apple CP/M files into a format the PC can work with. Some CP/M programs will also come into its range, as long as you have the Vertex CP/M emulator to hand.

The package costs £299, exclusive of VAT and delivery. Systems Constructors promises that it won't interfere with the ordinary running of the PC. The board minds its own business until you want to use it, at which stage it is simply a matter of loading the supporting progress and selecting DOS or CP/M from the menu.

This type of approach to data translation, side-stepping elaborate communications, promises a greater degree of machine independence for users. Even at the level of Turnover, where you'll be restricted almost completely to data files, the prospects of improving the life-expectancy of your investment in Apples look good.

But ironically, micro manufacturers are likely to look askance at such developments. It is in their interests to make their systems as inaccessible as possible to products from competing suppliers. IBM is the only likely winner here, being the largest available target.

DRG beats an orderly retreat

The company that introduced the Sirius to the UK has pulled out of the micro business.

DRG Business Systems' orderly retreat is in marked contrast to some recent withdrawals, and several companies will take over responsibility for its product range.

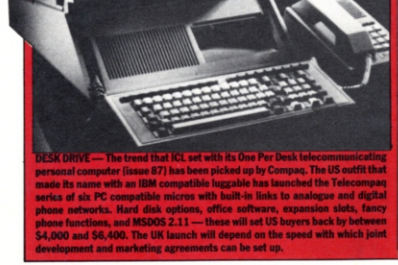
The most notable among them is Victor Technologies (UK). When DRG began to distribute the Sirius here, it was called the Victor 9000 as elsewhere in the world. ACT's Sirius, an identical machine but for its colour and keyboard, proved more successful largely on the strength of software support and DRG's Victor fell in among the also-rans when the IBM PC eventually appeared.

The Victor/Sirius confusion did DRG no good and in 1983 there was a period of gamesmanship between the company and ACT, with both seeking to establish themselves as the supplier of that machine.

The confusion arose in the US when Sirius Technology licensed Victor to build the machine.

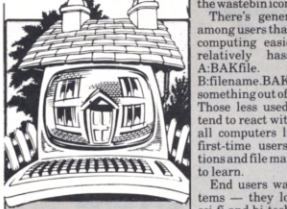
DRG also distributed TEC and Seikosha printers, Cado micros, disk units, and computer supplies. From March 31 all these will be handled by other companies — DRG's list includes names like Northamber, MBS, and Micro Peripherals.

● DRG's address in Weston-Super-Mare was Lynx Crescent. Has the Lynx jinx struck again?



DESK DRIVE — The trend that ICL set with its One Per Desk telecommunicating personal computer (issue 87) has been picked up by Compaq. The US outfit that made its name with an IBM compatible luggable has launched the Telecompaq series of six PC compatible micros with built-in links to analogue and digital phone networks. Hard disk options, office software, expansion slots, fancy phone functions, and MSDOS 2.11 — these will set US buyers back by between $4,000 and $6,400. The UK launch will depend on the speed with which joint development and marketing agreements can be set up.

HOMEFRONT



The WIMPs are set to take over

WIMPs are fashionable, WIMPs are in. And they herald a new interest in computing. Official endorsement for WIMPs arrives in the form of GEM (Graphics Environment Manager) on April 15. That's the day Digital Research releases its PCDOS front end, GEM Desktop.

WIMPs are important not because they bring any more computing power (though they usually need 16-bit architecture); if anything, WIMPs slow things down because they involve a lot of extra processor work and memory capacity (RAM and disk).

What makes them important is what they are — nothing more than a very straightforward front-end or interface: an imaginative combination of existing ideas.

The most important item in the WIMP concept is the mouse. Similar to an upside-down tracker ball, it's little more than a glorified joystick. As you move the mouse round the desktop, a pointer moves on the screen. The mouse has from one to three click buttons. To select an item from a menu you move the pointer to the menu title at the top of the screen, then click to select it, making the whole menu drop down from its title.

A window is a rectangle on the screen which usually contains information (such as the icons representing the files on a disk), or a menu. A window can be moved round the screen, made larger or smaller, all by mouse clicks and movement. And an icon is a tiny picture (sprite) that represents programs, files, disks, the wastebin, etc.

One of the most important functions of the mouse is 'dragging'. This is when you select an icon by clicking over it then, holding click down, you move the mouse and the pointer drags the icon round the screen. So, to copy a file from one disk to another, you simply drag the file's icon from one disk's directory window to another's. To erase a file, drag its icon over the wastebin icon and release it.

There's general agreement among users that WIMPs make computing easier, faster and relatively hassle-free. 'PIP A:BAKfile. BAK = B:filename.BAK' seems like something out of a history book. Those less used to computers tend to react with : 'Why aren't all computers like this?' And first-time users find applications and file management easy to learn.

End users want WIMP systems — they look good (very sci-fi and hi-tech), they're easy to use and they're a novelty. So DR has produced GEM and Microsoft is working hard to get Windows out by May. Atari has taken GEM on-board — literally, it's in ROM on the ST — and ACT has licensed GEM for its Apricot range.

The ACT tie-up, and the fact that the first release of GEM will only run on the IBM PC, AT and XT, will bring pressure to bear on OEMs like Olivetti to license GEM for their PC compatibles, or other (perhaps 68000-based) micros. And that's where companies like DR and Microsoft earn their bread and butter.

GEM threatens Apple and Microsoft. Because DR is keeping prices down, and hopes third-party software publishers will do likewise, a PC with GEM, a GEM-licensed compatible or an Apricot may be a more attractive proposition than a Macintosh.

Microsoft could run into trouble with its Windows, largely because of the long delay between announcement and launch.

So where does all this leave the home micro market? For a start, moves are afoot to raise home micros above the status of games machines. Micros are being given more facilities (QL, CP/M for Amstrad and BBC) and if Atari can keep the ST below £400, it will threaten Sinclair and rock the boat for low price, small business micros. The up-market version could be a match for the ACT Apricots and IBM PCs.

Micros without 128K RAM, disks and a monitor can't benefit from WIMPs, though it is possible to produce emulations, *eg* the AMX mouse for the Beeb. Given the sales performance of the most recent 8-bit home micros (Enterprise and MSX), it looks as if we won't see any more 64K, Z80, eight colour, 'Basic in ROM' machines.

To compete with Commodore's Amiga and Atari's ST they'll have to be 16-bit, and with 64K RAM chips down in price, why not slip in GEM, or your own front-end to make it more attractive? ***Bryan Skinner***

CHARTS

GAMES

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	1	Softaid	Softaid	SP, C64	£4.99
2	4	Bruce Lee	US Gold	SP, 64, AT	£9.95
3	2	Alien 8	Ultimate	SP	£9.95
4	7	Everyone's a Wally	Mikro-Gen	SP	£9.95
5	3	Raid over Moscow	US Gold	SP, C64, AT	£9.95
6	8	Impossible Mission	CBS/Epyx	C64	£9.95
7	6	Emerald Isle	Level 9	Various	£6.95
8	9	Castle Quest	Micropower	AC	£12.95
9	5	Technician Ted	Hewson	SP, AM	£5.95
10	13	Sorcery	Virgin	SP, C64, AM	£8.95
11	5	Ghostbusters	Activision	SP, C64, AT	£10.00
12	17	Airwolf	Elite	SP, C64, AM	£6.95
13	15	Pole Position	Atarisoft	Various	£9.95
14	11	Elite	Acornsoft	AC	£15.00
15	10	Monty is Innocent	Gremlin	SP	£6.95
16	18	Zaxxon	US Gold	SP, C64, AT	£9.95
17	12	Football Manager	Addictive	Various	£5.95
18	—	Moon Cresta	Incentive	SP	£6.95
19	—	Combat Lynx	Durrell	SP, C64, AC	£8.95
20	16	Brian Bloodaxe	Edge	SP	£7.95

SPECTRUM

TW	TITLE	PRICE
1	Softaid	£4.99
2	Bruce Lee	£9.95
3	Alien 8	£9.95
4	Everyone's a Wally	£9.95
5	Moon Cresta	£6.95
6	Raid over Moscow	£9.95
7	Ghostbusters	£9.99
8	Monty is Innocent	£6.95
9	Technician Ted	£5.95
10	Brian Bloodaxe	£7.95

COMMODORE

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These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **March 28**. The games chart is updated every week. The prices quoted are for the no-frills model and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month. PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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Cheers, not sneers, for Sir Clive

I am a forty-year-old, disabled father of two school-age children. May I, through your magazine, as someone who is neither a games freak, nor a schoolchild with access to £1,000 of BBC equipment, speak out against the seemingly endless stream of sarcasm, sneering, and general slagging off of Sir Clive Sinclair.

Sinclair's ZX81 gave me, and thousands like me, the only chance most of us would ever have to buy our own computer.

I bought mine about two years ago: an *excellent* manual, leads for TV and cassette, 16K expansion pack, transformer, and free Pacman, for the unbelievable price of £45.

Sinclair, single-handed, frightened other computer firms into lowering prices.

I know that the ZX81 is crude and slow, but where else would hundreds of thousands of people like me ever have found the chance to find out that computers are fun? From Acorn?

I now own a better computer, but I know that I would never have had a chance to start, had it not been for Sinclair. Like Henry Ford, Clive Sinclair took an expensive, wealthy persons plaything, and gave it to the masses.

There are more computers, per head of population, in this country, than anywhere else in the world. The computer and software industries employ thousands, and make millions.

So, please just now and then could someone say 'thank you' to the man?

P J Long,
Bedminster, Bristol.

Another satisfied Byte Drive 500 user

With reference to J P Hibbin's letter in issue 103, I too have been thoroughly pleased with the performance of the Byte Drive 500. It does everything and more than your review said it would (including some undocumented facilities):

- 440K of formatted storage in a nifty double-sided 3.5in. child-proof plastic diskette
- ability to chain four drives in one system, giving 1Mb in use at once
- extended Basic with window management, programmable function keys, Random-access files, printer echo, error-trapping, plus the amazing TYPE and DO commands, all documented.

I have found several undocumented facilities:

- when requesting a file, wildcards in the form of question marks, *eg* "MYFILEno.????", are allowed in the file name
- if in word processor mode you enter a single '?' as the file name, the DIRectory is helpfully presented
- the system can be reset by the on-off switch or — would you believe — the Basic command RESET, both of which will auto-boot the disk system. The Reset button tucked underneath just gives a hard Break.

Do I have a vested interest? You bet. I bought mine last year and I love it. I won't be happy if support fails because of a bad press.

L S Lewis,
Newport, Dyfed.

Dealers — better safe than sorry

I was, as the co-ordinator for a local motor-racing championship, last year searching for sponsorship. I agreed terms with a local dealer in small business computers. Seeing that he was a registered dealer for a reputable British computer manufacturer, I felt that this was proof enough of the sponsor's credibility. Sadly, within a few months our sponsor was bankrupt and despite previous personal assurances, our sponsor did not pay us.

It now turns out that he had previously had at least one previous major bankruptcy as a business computer dealer and left a myriad of debts in his wake. Yet, a major British company still made him its official dealer.

When I researched this matter further, it seems that anyone who puts up a comparatively small amount of capital, can become an official dealer for almost any business-related computer-product.

Firms which act in this way can only bring themselves and the computer industry as a whole, into disrepute. This sort of action seems to be, in the long run, totally futile.

Buy from somebody you are 100 per cent sure is reputable. It may be arduous task but it is better to be safe than sorry.

Patrick Young,
Belfast, N Ireland.

Proposed user group for MSX users . . .

A group of MSX owners in this area have decided to form a user group. We would like to contact other users of these machines.

The aim is to publish a newsletter/magazine for members featuring progam hints and technical tips. For instance, on using VPOKE commands to access the VDU. Also, comparisons and reviews of software and peripherals.

This depends to a certain amount on the number of people interested. Anyone who is should send a SAE to me.

Tony Brown, Emscote Mill, Wharf St, Warwick.

I didn't realise that multi-user meant everyone has a go for ten minutes an hour.

. . . and for a group with Enterprise

A bunch of Enterprise owners wish to start up an independent user group. Anyone interested please send an SAE for full details.

Mark Lissak, 40 Mansfield Rd, London NW3.

QL Quill bug is easily overcome

I should like to echo the comments made by W Spens (issue 103) in regard to the substantial improvements made in the update of QL Quill.

The bug noted in his letter seems rather stranger than he suggests. My experience shows that the last line of a file fails to print only when the file is newly loaded from Microdrive. At this stage, of course, the cursor is positioned at the start of the text. If the cursor is now moved to the end of the text the document will print correctly.

As far as my limited experiments have shown, if this has been done once, the document continues to print correctly regardless of the position of the cursor during the later printings.

Fortunately, the problem is easily overcome. It is not necessary manually to flush the printer buffer, but simply to adjust the printer driver (using "Install _bas") to send a carriage return character (ASCII 13) as the postamble code. Quill sends this to the printer at the end of each document, and it automatically flushes the buffer.

P Birch,
Paisley,
Renfrewshire.

Acornsoft exchanges Elite galactic bug

Good news for all Electron users — the old version of Elite can be exchanged with Acornsoft for a version without the galactic hyperspace bug.

S Jagidar,
Vauxhall, London.

ROUTINE ENQUIRES

Consult the experts with your problems by writing to Routine Enquiries, *PCN*, Evelyn House, 62 Oxford Street, London W1A 2HG

Using non-Commodore printers with the 64

Q I want a printer to use with my Commodore 64 for £100-£150. I understand that Epson, which has a good name, has just released the P-40. But I'm told non-Commodore printers don't produce the Commodore graphic characters — does this apply to the new Epson printer?
John Ormes, Crewe.

A Taking your last question first: very few printers other than Commodore's own print out the graphics characters that the machine uses. Unfortunately, this not only affects graphics that you wish to use in your programs but also any codes used to show screen control codes such as cursor.

A few manufacturers have now started to produce boards to sit inside standard printers, but these tend to be rather expensive at around £60 on top of roughly £250 for the printer.

Many interfaces are now available which allow the Commodore 64 to be used with most Centronics printers, and some of these also allow you to use the 64's character set or give an alternative such as [sA] for the graphics character generated by pressing Shift and A. We use such an interface in *PCN*'s office to produce our Commodore listings. Again, this option is expensive at up to about £90. You could look at the Micrografix interface, distributed in the UK by Impex (01-900 0999), or the one from Zero Electronics which is £42.95 (0493-842023).

Cheaper interfaces are available at around £20 that simply plug onto the user port and a small program is used to output all data to the printer. However, not all programs work with this type. Stack would be a good place to start enquiries (051-933 5511).

Unfortunately, we have not yet looked at the Epson you mention, but from the specifications we've seen it appears to be a Centronics or Serial thermal printer which takes a 4in roll of paper, not totally unlike the Sinclair ZX printer. You'll have to buy a Commodore interface. If the P-40 uses the standard control codes, you may be able to get all Commodore graphics by using one of the more expensive interfaces.

If you were prepared to forgo the graphics to use full size paper with your printer, you could take a look at the Brother HR5 printer. Again, it is thermal but won't cost much more than Epson's P-40.

Printers are still an expensive item and the nearer to £200 that you are willing to spend, the greater the chance of buying an interface that will make it behave like a normal Commodore printer.

● Issue 107 will contain a guide to some popular printers, and the Workbench section will show how to build a printer interface for the 64.

Getting around an anti-modem mum

Q Could you recommend a cheap modem for the Spectrum 48K that won't add too much to my mum's phone bill?
Kevin Miller, Patna, Ayrshire.

A Your mum has unfortunately got it in one — modems are almost inevitably heavy on the phone bill, unless you're careful how you use them. But that said you do seem to have got the wrong end of the stick.

Modems have different baud rates, baud being the measurement of the speed at which data is sent by the modem, so in theory the higher the baud rate, the faster data is sent, and therefore the lower the phone bill. However, the higher the baud rate, the more prone to error the setup is, so the more likely you are to have to try again, thus putting your phone bill up.

Even if you can do the necessary fast talking to obtain your modem, you'll almost certainly face the extra expense of getting onto one of the Prestel systems.

But don't despair — we have a plan. Why don't you try to persuade your mum to rent a TV that receives Prestel? You can use the usual spurious arguments — cutting edge of technology, teleshopping, see what the weather forecast is and so on.

If she caves in, you can leave a decent interval then buy yourself a Demon modem, which is a snip at £60 from Demon Electronics (01-930 1612). After all, if the family is using Prestel already, it won't be that much extra . . .

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Amstrad version of Beeb DIV operator

The CPC464 has two little known but useful features. The first is the counterpart of the BBC's DIV operator, represented by the '\' (the key above CTRL). For integer A and B, A\B returns the same result as INT(A/B), *ie* it returns the integer part of the quotient. If you get puzzling results check to see if you have used the correct symbol as both '\' and '/' are next to each other.

The other 'hidden extra' is CTRL-TAB which toggles between insert and overwrite mode. The latter overwrites text on the screen in the same way as the Commodore 64; the former shifts all the text along as you type.

D Higham,
Eccles, Manchester.

Beeb screen scroll in three Modes

The following routine scrolls the BBC's Mode 2/1/0 screens up or down. The routine is activated with call PROCSCR(T%,F%) where T% is the number of times the screen is to be scrolled, and F% is the direction, −1 for down, 1 for up.

Jonathan Temple,
Beeston, Nottingham.

```
  10MODE 2
  20PRINT"UP/DOWN SCROLL..."
  30FOR T=0 TO 10:GCOL 0,RND(7)
  40PLOT 85,RND(1280),RND(1024):NEXT
  50 PROCSCR(65,-1)
  60 PROCSCR(65,1) .
  70 END
1000DEFPROCSCR(T%,F%)
1010L%=&1000:H%=&6000
1020IF F%=-1 THEN L%=H%:H%=&1000
1030S%=H%:FOR N%=1 TO T%:*FX 19
1040?&FE00=12:?&FE01=S% DIV 256
1050?&FE00=13:?&FE01=S% MOD 256
1060S%=S%+F%*&50:IF S%=L% THEN S%=H%
1070NEXT
1080ENDPROC
```

Slow mover gives another option

The BBC's speed is one of its great advantages, but at times it is also a disadvantage, especially when listing programs to the screen. This routine provides an alternative to page mode or holding down CTRL+SHIFT.

It intercepts the OSWRCH vector, slowing down all printing to the screen. To change the speed, alter the contents of the address &70. A value of 0 gives more or less the usual speed, 255 slows it down the most.

R Randhawa,
Warley, West Midlands.

```
10A=&D00                  100BNE L0:DEX
20FOR P=0 TO 3 STEP 3     110BNE L0
30P%=A                    120.L1 PLA:TAY:PLA
40*OPT P                  130TAX:PLA:PLP
50PHP:PHA:TXA             140JMP &E0A4
60PHA:TYA:PHA             150]
70LDA&70:BEQ L1           160NEXT
80TAX:LDY#0               170?&20E=A MOD 256
90.L0 NOP:NOP:DEY         180?&20F=A DIV 256
```

Changing colours for a better display

This patch for the BBC's operating system allows the foreground colour of Mode 7 to be changed. Some televisions display blue or green text better. Normally this is achieved by using Mode 6 and the VDU19 command.

This routine makes all text output to the screen appear blue by intercepting the output routine and printing a CHR$134 if the last colour printed was a carriage return (CHR$13).

The value of &E0A4 in lines 190 and 120 is fine for OS 1.2. For other operating systems, this address can be found by PRINT~&20E AND &FFFF.

The code in line 205 is for cyan text which can be altered to 129 for red.

Line 240 puts the code in a backwater of the memory. Other possible sites are &900 for disk users, or &D00 for cassette users.

Jeff Tullin,
Gateshead, Tyne and Wear.

```
10 FOR X=0 TO 2 STEP 2      80LDA#130
20 P%=&B00                  90.NTEOL
30*OPT X                    100JSR&E0A4
40.START                    110RTS
50CMP #13                   120]
60BNE NTEOL                 130NEXT
70JSR&E0A4                  140?&20E=0:?&20F=&B
```

Improve your Amstrad joystick potential

This program is for those people who admire the fastfire facility available on some joysticks that don't work on the Amstrad CPC464.

The code is tucked away at the top of the memory and allows the joystick fire to repeat at the rate set by the speed key command.

The program should be run before the game and works by loading the accumulator with the joystick fire button key number and the B register with &FF (&FF is repeat on, &00 is repeat off) and finally calling the KM SET REPEAT firmware routine.

You may find that you have to alter the speed key setting to match the firing speed of the game.

B G Moone,
Reading, Berks.

```
1000 fastfire=HIMEM-7
1010 FOR addr=fastfire TO HIMEM
1020 READ dta
1030 POKE addr,dta
1040 NEXT addr
1050 CALL fastfire
1060 DATA &3E,&4C,&06,&FF,&CD,&39,
     &BB,&C9
```

Pound note for Oric Shinwa CP-80 users

I have an Oric Atmos, and a Shinwa CP-80. The following program allows you to LPRINT the £ (pound) sign. The Atmos uses the ASCII code 95 for this symbol whereas the Shinwa uses 129. The program changes the jump vector for the LPRINT routine to #400 where a few bytes of code check and, if necessary, change the contents of the accumulator before jumping to the LPRINT address.

The routine has the advantage that you can swap a character for any other. The ASCII code for the character is the second byte of the data; the code for the substitute is the 6th byte. It works with any printer, allowing some of the more obscure symbols to be printed directly.

271 CPL J Heymer,
RAF Sealand, Clwyd.

```
10 DOKE#23F,#400
20 FOR N=0 TO 8:READ J
30 POKE #400+N,J:NEXT
40 DATA 201,95,208,2,169,129,76,193,245
```

Winning duo get spring bonus

Congratulations are in order to Michael Warriner, of Shipston on Stour, Warks, for his winning Microwave of the Month for February (issue 100). His routine enabled an extra screen to be created on the BBC.

Andrew Smith, of Milton Keynes, is the winner of the March Microwave of the Month of his tip that allows you to switch screens on the BBC without losing the data on the screen (issue 103). A £50 cheque will be on its way to both soon.

ANYONE FOR TENNIS?

Make sense of machine code with this bouncey game, courtesy of Keith Hook and M Gaut.
The program can be altered to illustrate how the MTX's assembler works.

The Memotech MTX's in-built assembler/debugger is ideal for programming in Basic with 'in-line' machine code subroutines. However, once Basic has been mastered, most users get the urge to write in assembler: the routines run faster and allow certain special effects which are impossible in Basic.

Unfortunately, very little has been written about getting the best from the MTX assembler, and many users abandon the idea of attempting machine code as a result.

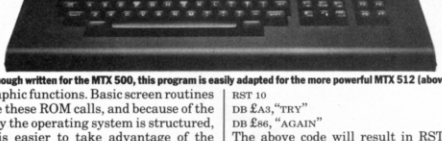
This listing is a game of practice tennis which allows you to alter any section of the code and experiment to see how it affects the game. For example it is quite easy to create a two player version, or to alter the angle at which the ball bounces off the walls or the bat.

Even the novice programmer can experiment and gain some ideas for future use. The source listing is fully documented for those of you who have not yet used the assembler.

How it works

The code starts at 8007 Hex — this is because it was written on a MTX 500 which only has 32K RAM. MTX 512 owners should type in the code exactly as printed, but when the assembler is entered by typing ASSEM 10, the code should start at 4007 Hex. The resulting code will align with the listing, but will always be prefixed by 4 instead of 8.

RST 10 instructions are used throughout the listing (see £800B). This call is an easy way to use the MTX's built-in



Although written for the MTX 500, this program is easily adapted for the more powerful MTX 512 (above).

graphic functions. Basic screen routines use these ROM calls, and because of the way the operating system is structured, it is easier to take advantage of the routines rather than write your own.

The RST 10 instruction expects certain information to follow the call, and depending upon this, the call will follow a certain course of action. These calls can draw lines, plot lines, create sprites, move sprites, print text and graphics to the screen, and much more.

The format for using RST 10 is:

```
RST 10
DB £83
DB "TRY"
```

The above example will print TRY on the screen, at the current cursor position. The function decides which command is to be executed by the bit pattern of the first byte (£83), which is the command byte.

Bit 7 6 5 4 3 2 1 0
Patt 1 0 cs Number of bytes

Here, bit 7 is set [£80 = 1000 0000], and we are printing three characters, so RST 10 DB £83 tells the MTX to print 3 characters at the current cursor location. Bit 5 is the Carry:Stop bit. If this bit is set (1) the RST 10 call executes the immediate command and then carries on to look for another command byte:

```
RST 10
DB £A3,"TRY"
DB £86,"AGAIN"
```

The above code will result in RST 10 printing TRY AGAIN on the screen at the current cursor location before it returns to the calling program. (For a complete explanation of these calls see *PCN* issue 64).

The program uses 16 by 16 sprites and this mode is selected by setting bit 1 of VDP Register 1. In order that this register can also carry out its other functions, a value of £C2 must be sent to this register.

RST 10 followed by DB £4C will select Virtual Screen 4 and clear it on entry.

LD A,R is an easy way of getting a random number in the range 0 — 127. The Refresh register is constantly counting up to 127, so you get the same number twice in a row.

Finally, under MTX Basic, the sprite attribute table is located at 16128 decimal and each entry consists of four bytes:

Byte 1 Vertical distance from top of screen
Byte 2 Horizontal distance from left hand edge
Byte 3 Pointer to sprite number
Byte 4 Sprite colour

Listing

```
8007    LD SP,(EFA96)     ; LOAD THE STACK POINTER FROM SYSTEM VARIABLES
800B    RST 10      ;RESTART 10
800C    DB £83,16,2,2     ;SET THE BACKGROUND COLOUR TO GREEN
8010 INIT:  RST 10      ;SWITCH TO VS 4 AND CLEAR IT
8011    DB £4C
8012    RST 10      ;RESTART 10
8013    DB £A3,16,3,15    ;SET THE PLOT INK COLOUR TO WHITE
8017    DB £A3,16,4,1     ;SET THE BORDER COLOUR TO BLACK
801B    DB £83,16,0,1     ;SET THE PRINT PAPER COLOUR TO BLACK
801F    LD A,£C2    ;SELECT 16&16 SPRITES
8021    OUT (2),A   ;BY SETTING BIT 1 OF VDP REGISTER 1
8023    LD A,£81
8025    OUT (2),A
8027    CALL MESGES       ;PRINT THE MESSAGES AT THE TOP OF THE SCREEN
802A    XOR A       ;CLEAR THE ACCUMULATOR
802B    LD (HIT),A  ;SET HITS TO 0
802E    LD (MISS),A       ;SET MISS TO 0
8031    LD A,100
8033    LD (BAT),A  ;SET THE Y COORDINATE OF THE BAT
8036    CALL PATTERN      ;SET THE SPRITE PATTERNS
8039    LD DE,(SATSAD)    ;DISPLAY THE BAT
803D    CALL VADOUT

8040    LD A,(BAT)
8043    OUT (1),A
8045    LD A,10
8047    CALL OUT
804A    LD A,0
804C    CALL OUT
804F    LD A,15
8051    CALL OUT
8054    CALL BORDER       ;DISPLAY THE BORDER AROUND THE COURT
8057 INIT1:  CALL RANDOM       ;SET BALL AT A RANDOM POSITION
805A    CALL DISSCR       ;DISPLAY THE SCORES
805D LOOP:  CALL UPDATE       ;REDISPLAY THE BALL
8060    CALL DELAY ;DELAY THE PROGRAM FOR A SHORT TIME
8063 NOGO:  IN A,(2)
8065    BIT 7,A
8067    JR NZ,NOGO
8069    CALL KBOARD       ;SCAN THE KEYBOARD
806C INC1:  LD HL,XINC ;INCREASE THE X COORD BY THE VALUE IN XINC
806F    LD A,(XCOOR)
8072    ADD A,(HL)
8073    CP 9        ;TEST FOR BALL GOING OF SCREEN
8075    JP C,SERVE
```

Listing (cont)

```
8078        CP 242    ;TEST FOR BALL HITTING RIGHT WALL
807A        JP NC,FIX1
807D        LD (IC0OR),A
8080 INCY:  LD HL,YINC ;INCREASE THE Y COORD BY THE VALUE IN YINC
8083        LD A,(YC0OR)
8086        ADD A,(HL)
8087 TESTY: CP 173    ;TEST FOR BOTTOM OF SCREEN
8089        JP NC,FIXY
808C        CP 10     ;TEST FOR TOP OF SCREEN
808E        JP C,FIXY
8091 SAVY:  LD (YC0OR),A
8094 CONT:  CALL TEST ;SEE IF BALL TOUCHING BAT
8097        JP LOOP   ;DO IT ALL AGAIN
809A DELAY: LD BC,(DELT)      ;GET THE CURRENT DELAY TIME
809E DEL1:  DEC BC
809F        LD A,B
80A0        OR C
80A1        JR NZ,DEL1
80A3        RET
80A4 FIX1:  LD A,(IC0OR)      ;THIS ROUTINE NEGATES THE IINC
80A7        LD HL,IINC
80AA        SUB (HL)
80AB        LD (IC0OR),A
80AE        LD A,(IINC)
80B1        NEG
80B2        LD (IINC),A
80B6        RET
80B7 FIXY:  LD A,(YC0OR)      ;THIS ROUTINE NEGATES THE YINC
80BA        LD HL,YINC
80BD        SUB (HL)
80BE        LD (YC0OR),A
80C1        LD A,(YINC)
80C4        NEG
80C5        LD (YINC),A
80C9        JP CONT
80CC KBOARD: LD A,6FB  ;TEST FOR UP KEY
80CE        OUT (S),A
80D0        IN A,(S)
80D2        CP £7F
80D4        JP Z,MOVUP ;IF IT IS,THEN MOVE BAT UP
80D7        LD A,BF   ;TEST FOR DOWN KEY
80D9        OUT (S),A
80DB        IN A,(S)
80DD        CP £7F
80DF        JP Z,MOVDN ;IF YES,THEN MOVE BAT DOWN
80E2        RET
80E3 FIXI:  CALL FIX  ;BOUNCE BALL IN X AXIS
80E6        JP INCY   ;AND Y AXIS
80E9 VADIN: PUSH AF   ;THIS ROUTINE SETS UP VRAM FOR READING
80EA        LD A,E    ;GET THE LOW PART OF THE ADDRESS
80EB        OUT (2),A ;AND SEND IT DOWN PORT TWO
80ED        LD A,D    ;GET THE HIGH PART OF THE ADDRESS
80EE        AND 63    ;MAKE SURE THAT BITS 6 AND 7 ARE OFF.THIS COMBINATION TELLS
                      THE VDP THAT IT IS REQUIRED TO SEND DATA BACK TO THE Z80
80F0        OUT (2),A ;OUTPUT THIS VALUE DOWN PORT TWO
80F2        POP AF
80F3        RET       ;RETURN
80F4 SATSAD: DW 16128 ;SPRITE ATTRIBUTE TABLE START ADDRESS
80F6 PATTERN:LD B,64  ;SET COUNTER
80F8        LD HL,DATA ;POINT HL AT PATTERN DATA
80FB        LD DE,14336       ;SET VRAM ADDRESS FOR WRITING TO THE PATTERN GENERATOR TABLE
80FE        CALL VADOUT
8101 PL1:   LD A,(HL) ;READ A BYTE FROM THE PATTERN DATA
8102        OUT (1),A ;AND SEND IT TO THE CORRECT PLACE IN VRAM
8104        INC HL    ;INCREMENT THE POINTER IN THE PATTERN DATA LIST
8105        DJNZ PL1  ;DECREMENT COUNTER AND DO IT AGAIN
8107        RET       ;RETURN
8108 VADOUT: PUSH AF  ;THIS ROUTINE SETS UP VRAM FOR WRITING
8109        LD A,E    ;GET THE LOW PART OF THE ADDRESS
810A        OUT (2),A ;AND SEND IT OUT THROUGH PORT TWO
810C        LD A,D    ;GET THE HIGH PART OF THE ADDRESS
810D        OR 64     ;MAKE SURE THAT BIT 6 OF THE VALUE IS SET
810F        AND 127   ;AND MAKE SURE THAT BIT 7 IS OFF.THIS COMBINATION OF BITS INFORMS
                      THE VDP THAT IT IS ABOUT TO RECEIVE DATA
8111        OUT (2),A ;SEND THIS VALUE DOWN PORT TWO
8113        POP AF
8114        RET       ;RETURN
8115 OUT:   OUT (1),A ;THIS ROUTINE IS USED,BECAUSE A DELAY OF AT LEAST 8 MICROSECENDS
                      IS NECESSARY BETWEEN SUCCESSIVE READS OR WRITES
8117        RET       ;RETURN
8118 MOVUP: LD A,(BAT) ;GET THE BAT COORDINATE
811B        CP 18     ;TEST TO SEE IF IT IS AT THE TOP OF THE SCREEN
811D        RET C     ;IF IT IS THEN RETURN WITHOUT MOVING IT.
811E        DEC A     ;OTHERWISE TAKE TWO OFF THE BAT POSITION
811F        DEC A
8120        LD (BAT),A ;AND STORE NEW BAT POSITION
8123        LD DE,(SATSAD)    ;SET UP THE ADDRESS OF THE SPRITE ATTRIBUTE TABLE
8127        CALL VADOUT
812A        OUT (1),A ;SEND THE Y COORDINATE OF THE BAT
812C        RET       ;AND RETURN
8120 MOVDN: LD A,(BAT) ;GET THE BAT COORDINATE
8130        CP 168    ;TEST TO SEE IF IT IS AT THE BOTTOM OF SCREEN
8132        RET NC    ;IF IT IS,THEN RETURN WITHOUT MOVING THE BAT
8133        INC A     ;OTHERWISE ADD TWO TO THE BAT COORDINATE
8134        INC A
8135        LD (BAT),A ;STORE IT AGAIN
8138        LD DE,(SATSAD)    ;SET UP TO WRITE TO THE SPRITE ATTRIBUTE TABLE
813C        CALL VADOUT
813F        OUT (1),A ;AND SEND THE NEW Y COORDINATE
8141        RET       ;RETURN
8142 TEST:  LD A,(XINC)       ;TEST TO SEE IF XINC IS POSITIVE
8145        BIT 7,A   ;BY TESTING BIT SEVEN.IF IT IS OFF,THEN THE VALUE IS POSITIVE
8147        RET Z     ;IF IT IS,RETURN BECAUSE THE BALL IS TRAVELLING FROM THE LEFT TO THE
                      RIGHT,AND THERFORE CAN'T HIT THE BALL
8148        LD A,(XC0OR)      ;TEST X COORDINATE OF BALL
814B        CP 22     ;IF NOT WITHIN X RANGE,RETURN
814D        RET NC
814E        CP 20
8150        RET C
8151        LD A,(YC0OR)      ;TEST Y COORD TO SEE IF BALL IS BELOW BAT
8154        LD B,A    ;OR BAT BELOW BALL
8155        LD A,(BAT)
8158        CP B
8159        JP C,TESTD ;IF THE BALL IS BELOW THE BAT,THEN JUMP TO A DIFFERENT TESTING ROUTINE
815C        SUB B     ;IF THE BAT IS BELOW THEN SUBTRACT THE BAT COORD FROM THE BALL COORD
815D        CP 12     ;AND SEE IF THEY ARE WITHIN 12 PIXELS OF EACH OTHER
815F        RET NC    ;IF THEY AREN'T,THEN RETURN
8160        JP HITB   ;OTHERWISE JUMP TO THE 'HIT BALL' ROUTINE
8163 TESTD: LD A,(BAT) ;GET THE BAT Y COORD
8166        LD B,A    ;STORE IT IN B
8167        LD A,(YC0OR)      ;GET THE BALL Y COORD
816A        SUB B     ;SUBTRACT THE BALL COORD FROM THE BAT COORD
816B        CP 17     ;ARE THEY WITHIN 17 PIXELS OF EACH OTHER?
816D        RET NC    ;IF THEY AREN'T,THEN RETURN
816E HITB:  CALL INCHIT       ;ADD ONE TO THE HIT COUNTER
8171        CALL FIXI ;CALL THE ROUTINE TO BOUNCE THE BALL
8174        RET       ;AND RETURN
8175 SERVE: CALL INCMIS       ;ADD ONE TO THE MISS COUNTER
8178        LD DC,0   ;MAKE A SHORT DELAY SO THAT THE NEW BALL ISN'T SERVED IMMEDIATELY
8178 SRV1:  DEC BC
817C        LD A,B
817D        OR C
817E        JR NZ,SRV1
8180        JP INIT1  ;AND SERVE A NEW BALL
8183 RANDOM: LD A,R   ;GET A NUMBER FROM THE REFRESHER REGISTER
8185        ADD A,10  ;MAKE SURE THAT IT IS MORE THAN 10
8187        LD (YC0OR),A      ;STORE IT IN THE BALLS Y COORDINATE
818A        LD A,12   ;STORE THE X COORDINATE OF THE BALL
818C        LD (IC0OR),A
818F        LD A,1    ;RESET I AND Y INCREMENTS TO 1.THESE VALUES COULD BE CHANGED TO MAKE
                      THE BALL GO FASTER RELATIVE TO THE BAT
8191        LD (XINC),A
8194        LD A,1
8196        LD (YINC),A
8199 UPDATE: LD DE,(SATSAD)     ;GET THE START OF THE SPRITE ATTRIBUTE TABLE
819D        INC DE    ;AND ADD FOUR TO IT,TO POINT TO THE START OF THE BALL BLOCK
819E        INC DE
819F        INC DE
81A0        INC DE
```

15 ▶

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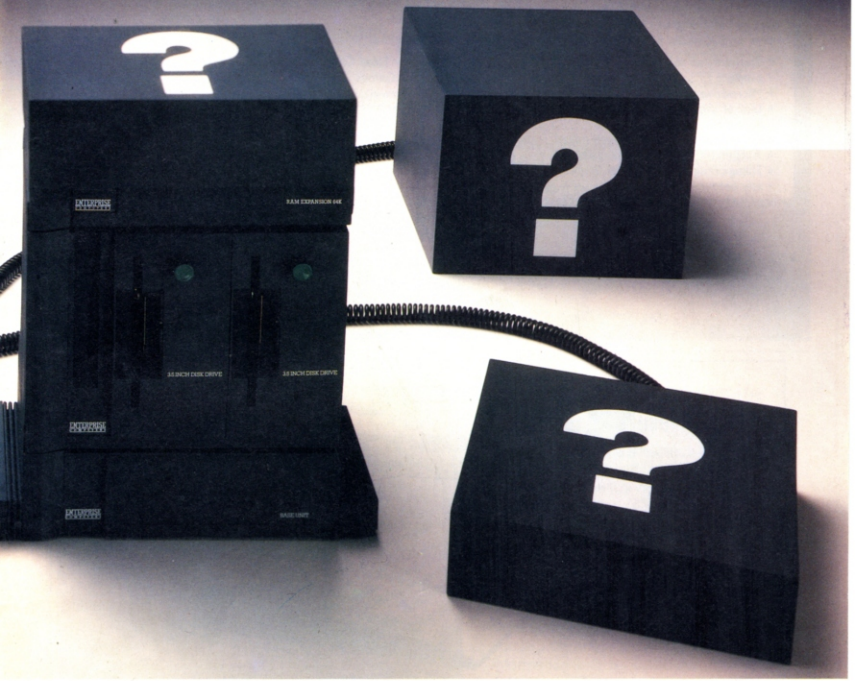

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Listing (cont)

```
81A1          CALL VADOUT       ;SET UP THIS ADDRESS FOR WRITING
81A4          LD A,(YCOOR)      ;GET THE BALL Y COORDINATE
81A7          CALL OUT  ;SEND THE Y COORD
81AA          LD A,(XCOOR)      ;GET THE X COORDINATE
81AD          CALL OUT  ;SEND THE X COORD
81B0          LD A,4
81B2          CALL OUT  ;SEND THE PATTERN NUMBER
81B5          LD A,15
81B7          CALL OUT  ;SEND THE COLOUR (WHITE)
81BA          LD A,208
81BC          OUT (1),A ;MARK THE END OF THE SPRITE TABLE
81BE          RET
81BF BORDER: RST 10     ;RESTART 10
81C0          DB &A5,2,0,7,255,7,&A5,2,255,7,255,175,&B5,2,255,175,0,175 ;THIS DATA DRAWS THE
              LINES AROUND THE EDGE OF THE SCREEN
81D2          RET       ; RETURN
81D3 MESSES: LD HL,MES1 ;POINT HL AT MESSAGE 1
81D6          LD DE,&010A       ;SET COORDINATES
81D9          CALL MESS ;CALL MESSAGE PRINTING ROUTINE
81DC          LD HL,MES2 ;DO IT AGAIN,BUT USE DIFFERENT MESSAGES
81DF          LD DE,&0101
81E2          CALL MESS
81E5          LD HL,MES3
81E8          LD DE,&0117
81EB          CALL MESS
81EE          RET
81EF MESS:    LD (CORD),DE      ;STORE THE COORDINATES
81F3          RST 10    ;RESTART 10
81F4          DB &B2,3  ;DATA TO SET CURSOR COORDINATES
81F6 CORD:    DW 0
81F8 MLOOP:   LD A,(HL) ;GET A CHARACTER FROM THE MESSAGE
81F9          CP 0      ;IS IT ZERO
81FB          RET Z     ;IF YES,RETURN
81FC          LD (CHAR),A       ;OTHERWISE STORE CHARACTER
81FF          RST 10    ;RESTART 10
8200          DB &B1    ;AND PRINT THE CHARACTER
8201 CHAR:    DB 0
8202          INC HL    ;MOVE THE MESSAGE POINTER ON BY ONE
8203          JR MLOOP  ;GO BACK AND DO IT AGAIN
8205 INCHIT: LD A,(HIT) ;GET THE NUMBER OF HITS
8208          ADD A,1   ;ADD ONE TO IT
820A          DAA       ;DECIMAL ADJUST IT FOR BCD ARITHMETIC
820B          LD (HIT),A ;STORE IT BACK AGAIN
820E          CALL DISSCR       ;DISPLAY THE SCORES
8211          LD HL,(DELT)      ;GET THE DELAY TIME
8214          LD DE,13  ;TAKE 13 OF IT
8217          AND A
8218          SBC HL,DE
821A          LD (DELT),HL      ;STORE IT BACK AGAIN
821D          LD A,(HIT) ;GET THE NUMBER OF HITS
8220          CP &10    ;IS IT 10?
8222          JP Z,WON  ;IF YES,THEN GO TO WON ROUTINE
8225          RET       ;OTHERWISE RETURN
8226 INCMIS: LD A,(MISS)       ;GET THE NUMBER IF MISSES
8229          ADD A,1   ;ADD ONE TO IT
822B          DAA       ;DECIMAL ADJUST IT FOR BCD ARITHMETIC
822C          LD (MISS),A       ;STORE I BACK AGAIN
822F          CALL DISSCR       ;DISPLAY THE SCORES
8232          LD A,(MISS)       ;GET THE NUMBER OF MISSES
8235          CP &20    ;IS IT 20?
8237          JP Z,OVER ;IF YES,JUMP TO THE GAME OVER ROUTINE
823A          RET       ;OTHERWISE RETURN
823B DISSCR: RST 10     ;RESTART 10
823C          DB &B3,3,30,1     ;SET THE CURSOR COORDINATES TO 30,1
8240          LD A,(MISS)       ;GET THE NUMBER OF MISSES
8243          CALL CONV ;CONVERT IT INTO PRINTABLE CHARACTERS
8246          LD A,B    ;GET THE 'TENS' VALUE
8247          CALL DIS  ;DISPLAY IT
824A          LD A,C    ;GET THE 'UNITS' VALUE
824B          CALL DIS  ;DISPLAY IT
824E          RST 10    ;RESTART 10
824F          DB &B3,3,6,1      ;SET THE CURSOR COORDINATES TO 6,1
8253          LD A,(HIT) ;GET THE NUMBER OF HITS
8256          CALL CONV ;CONVERT IT INTO PRINTABLE CHARACTERS
8259          LD A,B    ;GET THE 'TENS' VALUE
825A          CALL DIS  ;DISPLAY IT
825D          LD A,C    ;GET THE 'UNITS' VALUE
825E          CALL DIS  ;DISPLAY IT
8261          RET       ;RETURN
8262 CONV:    LD D,A    ;STORE THE VALUE IN D
8263          AND &F0   ;MASK OFF THE RIGHT FOUR BITS
8265          SRL A     ;SHIFT IT RIGHT FOUR PLACES
8267          SRL A
8269          SRL A
826B          SRL A
826D          AND A     ;AND ADD 48,TO MAKE IN INTO THE CORRECT PRINTABLE
826E          ADC A,48  ;CHARACTER
8270          LD B,A    ;STORE IT IN B
8271          LD A,D    ;GET THE ORIGINAL VALUE
8272          AND &0F   ;MASK OFF THE LEFT FOUR BITS
8274          AND A     ;ADD 48 TO IT,TO TURN IT INTO A
8275          ADC A,48  ;PRINTABLE CHARACTER
8277          LD C,A    ;STORE IT IN C
8278          RET       ;RETURN
8279 DIS:     LD (CHAR1),A      ;STORE THE CHARACTER
827C          RST 10    ;RESTART 10
827D          DB &B1    ;PRINT IT
827E CHAR1:   DB 0
827F          RET       ;RETURN
8280 WON:     LD HL,MES9 ;POINT HL AT MESSAGE 9
8283          LD DE,&0808       ;SET THE COORDINATES
8286          CALL MESS ;CALL THE MESSAGE PRINTING ROUTINE
8289          CALL MESSTO8      ;PRINT MESSAGES 5 TO 8
828C          RET       ;RETURN
828D OVER:    LD HL,MES4 ;POINT HL AT MESSAGE 4
8290          LD DE,&0809       ;SET THE COORDINATES
8293          CALL MESS ;CALL THE MESSAGE PRINTING ROUTINE
8296 MESSTOR:LD HL,MESS ;THE NEXT ROUTINE JUST PRINTS MESSAGES
8299          LD DE,&0A0A       ;5 TO 8
829C          CALL MESS
829F          LD HL,MES6
82A2          LD DE,&0B0C
82A5          CALL MESS
82A8          LD HL,MES7
82AB          LD DE,&0D09
82AE          CALL MESS
82B1          LD HL,MES8
82B4          LD DE,&0E0C
82B7          CALL MESS
82BA KLOOP:   CALL &0079 ;GET A CHARACTER FROM KEYBOARD
82BD          CP 0      ;IS ONE BEING PRESSED?
82BF          JR Z,KLOOP ;IF NOT,JUMP BACK AND TRY AGAIN
82C1          CP 13     ;IS IT THE RETURN KEY
82C3          JP Z,INIT ;IF YES,START THE PROGRAM AGAIN
82C6          CP 3      ;IS IT THE BREAK KEY?
82C8          JP Z,END  ;IF YES,JUMP TO THE END
82CB          JR KLOOP  ;OTHERWISE JUMP BACK AND TEST AGAIN
82CD          RET       ;RETURN
82CE END:     LD SP,&FD46       ;POINT THE STACK POINTER AT THE CALLING ADDRESS
82D1          RET       ;AND RETURN TO IT.
8202 DATA:    DB 0,0,0,
```

DRIVE MASTER

This week we bring you the third and last section of Gavin Monk's menu driven Microdrive utility which tidies up after a hard day's work.

Listing (cont)

```
28250         ON key=2: load_file
28260         ON key=3: save_file
28270         ON key=4:IF call_type:merge_
error:ELSE REturn
28280         ON key=5: delete_file
28290         ON key=6: print_file
28300         ON key=7: backup_cart 1,2,0
28310         ON key=8: rename_file
28320       END SELect
28330     END REPeat main_loop
28340 END DEFine menu
28350 DEFine PROCedure format_cart
28360   UNDER 1:CLS: AT 1,8:PRINT 'FORMA
T A CARTRIDGE': UNDER 0
28370   get_drive_no
28380   AT 5,0:INPUT ' Cartridge Name:..
.....'!cart_name$
28390   IF LEN(cart_name$)>10 OR LEN(car
t_name$)=0 OR ' ' INSTR cart_name$ : AT
5,20:PRINT FILL$(' ',20): GO TO 28380
28400   PRINT \' Number of format times
(1-4)... '!:FLASH 1:PRINT'?':FLASH 0
28410   REPeat times
28420     key$=INKEY$
28430     IF key$)'0' AND key$<'5' THEN
EXIT times
28440   END REPeat times
28450   AT 7,33:PRINT key$
28460   PRINT\\' Press CTRL  &  ENTER to
 format the  cartridge in drive'!drive_n
o!'.'
28470   PRINT\' Press ESC to return to m
ain menu.'
28480   REPeat wait
28490     IF KEYROW(7)=2 AND KEYROW(1)=1
28500       AT 10,0:PRINT' Drive '!drive
_no!' now being formatted '!
28510       IF key$="1":PRINT 'once. ':
ELSE PRINT !key$!' times'
28520       PRINT FILL$(' ',106)
28530       FOR format_times=1 TO key$:F
ORMAT 'mdv'&drive_no&'_'&cart_name$
28540       EXIT wait
28550     END IF
28560   IF KEYROW(1)=8 THEN EXIT wait
28570   END REPeat wait
28580 END DEFine format_cart
28590 DEFine PROCedure get_drive_no
28600   AT 3,1:PRINT 'Input Drive Number
 (1-8).......'!:FLASH 1:PRINT!'?'!: FLAS
H 0
28610   REPeat get_drive
28620     key$=INKEY$
28630     IF key$)'0' AND key$<'9': EXIT
 get_drive
28640   END REPeat get_drive
28650   drive_no=key$
28660   AT 3,33: PRINT drive_no
28670 END DEFine get_drive_no
28680 DEFine PROCedure dir_to_files$(driv
e_no)
28690   DIM files$(51,32)
28700   DELETE 'mdv'&drive_no&'_zzzzzzzz
zz':OPEN_NEW£5,'mdv'&drive_no&'_zzzzzzzz
zz'
28710   DIR£5,'mdv'&drive_no&'_'
28720   CLOSE£5
28730   OPEN_IN£5,'mdv'&drive_no&'_zzzzz
zzzzz'
28740   INPUT£5,cart_name$:REMark cartri
dge name
28750   INPUT£5,cart_space$:REMark cartr
idge space
28760   no_of_files=1
28770   REPeat get_files
28780     INPUT£5,files$(no_of_files)
28790     IF files$(no_of_files)='zzzzzz
zzzz':no_of_files=no_of_files-1
28800       IF EOF(£5):EXIT get_files
28810       no_of_files=no_of_files+1
28820   END REPeat get_files
28830   CLOSE£5
28840   DELETE 'mdv'&drive_no&'_zzzzzzzz
zz'
28850   IF files$(no_of_files+1)<>'':fil
es$(no_of_files+1)=FILL$(' ',20)
28860 END DEFine dir_to_files$
28870 DEFine FuNction file_on_drive(driv
e_no,file$)
28880   LOCal i,found,files$(51,32)
28890   dir_to_files$ drive_no
28900   found=0
28910   FOR i=1 TO no_of_files
28920     IF files$(i)==file$: found=1
28930   END FOR i
28940   REturn found
28950 DEFine PROCedure llist(file_name$,
drive_no)
28960   OPEN£5,ser1
28970   PRINT£5,file_name$
28980   PRINT£5,DATE$
28990   PRINT£5
29000   CLOSE£5
29010   COPY_N 'mdv'&drive_no&'_'&file_n
ame TO ser1
29020 END DEFine llist
29030 REMark ***************************
*****************************
29040 REMark **********MERGE DOES NOT WO
RK IN PROCEDURES***************
29050 REMark ***************************
*****************************
29060 CLS:AT 1,12:UNDER 1:PRINT 'MERGE A
 FILE':UNDER 0
29070 get_drive_no:dir_to_files$ drive_n
o:select_files 'M'
29080 FOR i=1 TO no_of_files:IF selected
$(i)='M':file_name$=files$(i)
29090 IF LEN(file_name$)<>0:MERGE 'mdv'&
drive_no&'_'&file_name$
29100 GO TO 25050
32765 DATA 4,'Whole Cartridge','Selected
 Files','Auto Overwrite','Change Drive N
umbers'
32766 DATA 31,28,31,30,31,30,31,31,30,31
,30,31
32767 DATA 8,'Format a Cartridge','Load
a File','Save a File','Merge a File','De
lete File(s)','List File(s) to Printer',
'Backup a Cartridge','Rename a File(s)'
```

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TRACE OF A SOLUTION

If the frustration of debugging your programs threatens to drive you into the mad-house, try this handy machine code solution from Stuart Nicholls. And it opens up a new avenue of programming possibilities.

Spectrum owners who can't face another mammoth Basic program debugging exercise could try this machine code solution. It helps with the debugging and opens up a range of possibilities for machine code programmers.

You'll cover the method of running a Basic program under the control of the operator, stepping through the program a statement at a time, either at predetermined intervals or when a key is pressed, displaying the line and statement number being executed. In other words you'll end up with a TRACE (TRON) facility as found on many other computers.

This routine is *not* interrupt driven: it diverts the running of a Basic program from the ROM interpreter to our own interpreter in RAM. With this set up, it is a simple matter to insert an extra machine code routine (TRON) into the interpreter so a printout can be given after each statement is executed.

Using the program

To set up the routine use a hexloader and enter the code as in the hexdump. Don't forget to set RAMTOP to 64499 before entering the code. Then save it using:

SAVE "TRACE" CODE 64500,547

To check the routine you need to know some of the following instructions.

The delay between the execution of each statement is set up in a similar manner to the PAUSE command, in that the unused system variables 23728/23729 hold the number of ⅟₅₀th seconds delay. For example, a delay of two seconds requires the direct commands:

POKE 23728,100 : POKE 23729,0

Similarly a delay of ten seconds requires:

POKE 23729,INT(500/256) : POKE 23728, (500-256*PEEK 23729)

An infinite delay that allows a step only when a key is pressed is:

POKE 23728,0 : POKE 23729,0

Once this delay is set up and your Basic program is loaded, run it using:

RANDOMIZE USR 64500 : RUN

as a direct command. If it's the first line of your program use:

1 RANDOMIZE USR 64500: GOTO NEXT LINE

Your program should now run as normal, but with a printout at 21,0; of the current line and statement in the form [20:5]. All errors are reported when found and the break keys function. What's more, if a bug is found, it can be corrected and the program run without the TRACE using the RUN command in the usual way thus using the ROM interpreter.

Listing 2 is my assembly listing for machine code programmers who are interested in the working of the routine. The main part is a copy of that in ROM but with the addition of the CALLTRON routine at line 0545, *ie* after the correct interpretation of a statement and the checking of the break keys (line 0510)

The diverting of the ROM interpreter is achieved at the beginning of the code by ensuring that the ERR-SP is correctly set up with 1303h and that the machine stack is cleared. In other words, the command RANDOMIZE USR 64500 is assumed completed when the code reaches line 0024, and our interpreter takes over to execute the next statement at STLP line 0040; the next statement, of course, is run and as such [0:2] is the first TRACE output.

Machine code programmers will also notice that it has been necessary to redirect the REM and IF commands to run in our RAM interpreter, as those in ROM will cause the routine to re-enter the ROM interpreter and we would lose our TRACE.

This method of diverting the ROM interpreter to one in RAM opens up the path to rewriting the whole of Spectrum Basic.

Listing 1

```
CODE 64500,547
FBF4  00 00 00 00 00 00 00 00 = 00
FBFC  00 00 00 ED 7B 3D 5C 21 = 22
FC04  03 13 E3 21 A0 FC 22 A6 = 7E
FC0C  FD 21 3A FD 22 84 FD E7 = DF
FC14  CD BF 16 FD 34 0D FA 8A = 64
FC1C  1C DF 06 00 FE 0D 28 7D = B1
FC24  FE 3A 28 EB 21 61 FC E5 = AE
FC2C  4F E7 79 D6 CE DA CA 18 = 0F
FC34  4F 21 48 FD 09 4E 09 18 = 2D
FC3C  03 2A 74 5C 7E 23 22 74 = 34
FC44  5C 01 3D FC C5 4F FE 20 = C8
FC4C  30 0C 21 01 1C 06 00 09 = 89
FC54  4E 09 E5 DF 05 C9 DF B9 = 81
FC5C  C2 8A 1C E7 C9 CD 54 1F = 58
FC64  38 02 CF 14 CD E5 FC FD = C8
FC6C  CB 0A 7E 20 67 2A 42 5C = A2
FC74  CB 7C 28 14 21 FE FF 22 = C3
FC7C  45 5C 2A 61 5C 2B ED 5B = FB
FC84  59 5C 1B 3A 44 5C 18 2F = F1
FC8C  CD 6E 19 3A 44 5C 28 15 = 6B
FC94  A7 20 3F 47 7E E6 C0 78 = E9
FC9C  28 0B CF FF C1 2A 55 5C = 9D
FCA4  3E C0 A6 C0 AF FE 01 CE = E0
FCAC  00 56 23 5E ED 53 45 5C = B8
FCB4  23 5E 23 56 EB 19 23 22 = 43
FCBC  55 5C EB 22 5D 5C 57 1E = EC
FCC4  00 FD 36 0A FF 15 FD 72 = C0
FCCC  0D CA 13 FC 14 CD 8B 19 = 6B
FCD4  28 02 CF 16 DF FE 0D 28 = 21
FCDC  C4 FE 3A CA 13 FC C3 8A = 22
FCE4  1C 2A 51 5C E5 3A 6A 5C = D8
FCEC  F5 2A 84 5C E5 2A 88 5C = F2
FCF4  E5 3E 02 CD 01 16 3E 16 = 5D
FCFC  D7 3E 15 D7 AF D7 3E 5B = 20
FD04  D7 ED 4B 45 5C CD 1B 1A = B2
FD0C  3E 3A D7 ED 4B 47 5C 06 = 30
FD14  00 CD 1B 1A 3E 5D D7 06 = 7A
FD1C  05 3E 20 D7 10 FB E1 22 = 48
FD24  88 5C E1 22 84 5C F1 32 = EA
FD2C  6A 5C E1 22 51 5C ED 4B = AE
FD34  B0 5C CD 3D 1F C9 C1 EF = AE
FD3C  02 38 EB CD E9 34 DA A1 = 8A
FD44  FC C3 14 FC B1 CB BC BF = C6
FD4C  C4 AF B4 93 91 92 95 98 = 0A
FD54  98 98 98 98 98 98 7F 81 = 90
FD5C  2E 6C 6E 70 48 94 56 3F = E9
FD64  41 2B 17 1F 37 77 44 0F = A3
FD6C  59 2B 43 2D 51 3A 6D 42 = 2E
FD74  0D 49 19 44 15 5D 01 3D = 63
FD7C  02 06 00 67 1E 06 CB 05 = 63
FD84  00 00 06 00 ED 1E 00 EE = FF
```

Listing 1 (cont)

```
FD8C  1C 00 23 1F 04 3D 06 CC = 71
FD94  06 05 03 1D 04 00 AB 1D = F7
FD9C  05 CD 1F 05 89 20 05 02 = A6
FDA4  2C 05 00 00 00 B7 11 03 = FC
FDAC  A1 1E 05 F9 17 08 00 80 = 5C
FDB4  1E 03 4F 1E 00 5F 1E 03 = 0E
FDBC  AC 1E 00 6B 0D 09 00 DC = 27
FDC4  22 06 00 3A 1F 05 ED 1D = 90
FDCC  05 27 1E 03 42 1E 09 05 = BB

FDD4  82 23 00 AC 0E 05 C9 1F = 4C
FDDC  05 F5 17 0B 0B 0B 0B 08 = 45
FDE4  00 F8 03 09 05 20 23 07 = 53
FDEC  07 07 07 07 05 08 00 7A = A5
FDF4  1E 06 00 94 22 05 60 1F = 5E
FDFC  06 2C 0A 00 36 17 06 00 = 8F
FE04  E5 16 0A 00 93 17 0A 2C = E5
FE0C  0A 00 93 17 0A 00 93 17 = 68
FE14  00 93 17 = AA
```

Listing 2

```
0010          ORG  64500
0011          DEFW 0000H
0012          DEFW 0000H
0013          DEFW 0000H
0014          DEFW 0000H
0015          DEFW 0000H
0016          DEFB 00H
0017          LD   SP,(23613)
0020          LD   HL,1303H
0024          EX   (SP),HL
0025          LD   HL,PREM
0030          LD   (PREM),HL
0032          LD   HL,IF
0034          LD   (PIF),HL
0040 STLP     RST  20H
0050 STLP1    CALL 16BFH
0060          INC  (IY+13)
0070          JP   M,1C0AH
0089          RST  18H
0090          LD   B,0
0100          CP   0DH
0110          JR   Z,LNEND
0120          CP   3AH
0130          JR   Z,STLP
0140          LD   HL,STRET
0150          PUSH HL
0160          LD   C,A
0170          RST  28H
0180          LD   A,C
0190          SUB  0CEH
0200          JP   C,18CAH
0210          LD   C,A
0220          LD   HL,OFFST
0230          ADD  HL,BC
0240          LD   C,(HL)
0250          ADD  HL,BC
0260          JR   GTPAR
0270 SCLP     LD   HL,(23668)
0290 GTPAR    LD   A,(HL)
0300          INC  HL
0310          LD   (23668),HL
0320          LD   BC,SCLP
0330          PUSH BC
0340          LD   C,A
0350          CP   20H
0360          JR   NC,SEP
0370          LD   HL,1C01H
0380          LD   B,0
0390          ADD  HL,BC
0400          LD   C,(HL)
0410          ADD  HL,BC
0420          PUSH HL
0430          RST  18H
0440          DEC  B
0450          RET
0460 SEP      RST  18H
0470          CP   C
0480          JP   NZ,1C0AH
0490          RST  20H
0500          RET
0510 STRET    CALL 1F54H
0520          JR   C,STRT1
0530          RST  8
0540          DEFB 14H
0545 STRT1    CALL TRON
0550          BIT  7,(IY+10)
0560          JR   Z,STNXT
0570          LD   HL,(23618)
0580          BIT  7,H
0590          JR   Z,LNNEW
0600 LNRUN    LD   HL,0FFFEH
0610          LD   (23621),HL
0620          LD   HL,(23649)
0630          DEC  HL
0640          LD   DE,(23641)
0650          DEC  DE
0660          LD   A,(23620)
0670          JR   NXTLN
0680 LNNEW    CALL 19E8H
0690          LD   A,(23620)
0700          JR   Z,LNUSE
0710          AND  A
0720          JR   NZ,LOST
0730          LD   B,A
0740          LD   A,(HL)
0750          AND  0C0H
0760          LD   A,B

0770          JR   Z,LNUSE
0780          RST  8
0790          DEFB 0FFH
0800 REM      POP  BC
0810 LNEND    LD   HL,(23637)
0820          LD   A,0C0H
0830          AND  (HL)
0840          RET  NZ
0850          XOR  A
0860 LNUSE    CP   1
0870          ADC  0
0880          LD   D,(HL)
0890          INC  HL
0900          LD   E,(HL)
0910          LD   (23621),DE
0920          INC  HL
0930          LD   E,(HL)
0940          INC  HL
0950          LD   D,(HL)
0960          EX   DE,HL
0970          ADD  HL,DE
0980          INC  HL
0990 NXTLN    LD   (23637),HL
1000          EX   DE,HL
1010          LD   (23645),HL
1020          LD   D,A
1030          LD   E,0
1040          LD   (IY+10),0FFH
1050          DEC  D
1060          LD   (IY+13),D
1070          JP   Z,STLP
1080          INC  D
1090          CALL 198BH
1100          JR   Z,STNXT
1110 LOST     RST  8
1120          DEFB 16H
1130 STNXT    RST  18H
1140          CP   0DH
1150          JR   Z,LNEND
1160          CP   3AH
1170          JP   Z,STLP
1180          JP   1C0AH
1190 TRON     LD   HL,(23633)
1200          PUSH HL
1210          LD   A,(23658)
1220          PUSH AF
1222          LD   HL,(23684)
1224          PUSH HL
1226          LD   HL,(23688)
1228          PUSH HL
1230          LD   A,2
1240          CALL 1601H
1250          LD   A,22
1260          RST  16
1270          LD   A,21
1280          RST  16
1290          XOR  A
1300          RST  16
1310          LD   A,91
1320          RST  16
1330          LD   BC,(23621)
1340          CALL 1A1BH
1350          LD   A,3AH
1360          RST  16
1370          LD   BC,(23623)
1380          LD   B,8
1390          CALL 1A1BH
1400          LD   A,93
1401          RST  16
1402          LD   B,5
1403 #2       LD   A,32
1404          RST  16
1405          DJNZ #2
1410          POP  HL
1412          LD   (23688),HL
1414          POP  HL
1416          LD   (23684),HL
1420          POP  AF
1430          LD   (23658),A
1440          POP  HL
1450          LD   (23633),HL
1460          LD   BC,(23728)
1470          CALL 1F3DH
1510          RET
1511 IF       POP  BC
1512          RST  28H
1513          DEFB 02H

1514          DEFB 3BH
1515          EX   DE,HL
1516          CALL 34E9H
1517          JP   C,LNEND
1518          JP   STLP1
1520 OFFST    DEFB 0B1H
1530          DEFB 0CBH
1540          DEFB 0BCH
1550          DEFB 0BFH
1560          DEFB 0C4H
1570          DEFB 0AFH
1580          DEFB 0B4H
1590          DEFB 93H
1600          DEFB 91H
1610          DEFB 92H
1620          DEFB 95H
1630          DEFB 98H
1640          DEFB 98H
1650          DEFB 98H
1660          DEFB 98H
1670          DEFB 98H
1680          DEFB 98H
1690          DEFB 98H
1700          DEFB 7FH
1710          DEFB 81H
1720          DEFB 2EH
1730          DEFB 6CH
1740          DEFB 6EH
1750          DEFB 70H
1760          DEFB 48H
1770          DEFB 94H
1780          DEFB 56H
1790          DEFB 3FH
1800          DEFB 41H
1810          DEFB 2BH
1820          DEFB 17H
1830          DEFB 1FH
1840          DEFB 37H
1850          DEFB 77H
1860          DEFB 44H
1870          DEFB 0FH
1880          DEFB 59H
1890          DEFB 2BH
1900          DEFB 43H
1910          DEFB 2DH
1920          DEFB 51H
1930          DEFB 3AH
1940          DEFB 6DH
1950          DEFB 42H
1960          DEFB 0DH
1970          DEFB 49H
1980          DEFB 19H
1990          DEFB 44H
2000          DEFB 15H
2010          DEFB 5DH
2020 PARA     DEFB 01H
2030          DEFB 3DH
2040          DEFB 02H
2050          DEFB 06H
2060          DEFB 00H
2070          DEFW 1E67H
2080          DEFB 06H
2090          DEFB 0CBH
2100          DEFB 05H
2110 PIF      DEFW 0000H
2120          DEFB 06H
2130          DEFB 00H
2140          DEFW 1EEDH
2150          DEFB 00H
2160          DEFB 1CEEH
2170          DEFB 00H
2180          DEFW 1F23H
2190          DEFB 04H
2200          DEFB 3DH
2210          DEFB 06H
2220          DEFB 0CCH
2230          DEFB 06H
2240          DEFB 05H
2250          DEFW 1D03H
2260          DEFB 04H
2270          DEFB 00H
2280          DEFW 1DABH
2290          DEFB 05H
2300          DEFW 1FCDH
2310          DEFB 05
2320          DEFW 2089H
2330          DEFB 05

2340          DEFW 2C02H
2350          DEFB 05
2360 PREM     DEFW 0000H
2370          DEFB 00H
2380          DEFW 1187H
2390          DEFB 03
2400          DEFW 1EA1H
2410          DEFB 05H
2420          DEFW 17F9H
2430          DEFB 08H
2440          DEFB 00H
2450          DEFW 1680H
2460          DEFB 03H
2470          DEFW 1E4FH
2480          DEFB 00H
2490          DEFW 1E5FH
2500          DEFB 03H
2510          DEFW 1EACH
2520          DEFB 00H
2530          DEFW 0D6BH
2540          DEFB 09H
2550          DEFB 00H
2560          DEFW 22DCH
2570          DEFB 05H
2580          DEFB 00H
2590          DEFW 1F3AH
2600          DEFB 05H
2610          DEFW 1DEDH
2620          DEFB 05H
2630          DEFW 1827H
2640          DEFB 03H
2650          DEFW 1E42H
2660          DEFB 05H
2670          DEFB 05H
2680          DEFW 2382H
2690          DEFB 00H
2700          DEFW 1EACH
2710          DEFB 05H
2720          DEFW 1C99H
2730          DEFB 05H
2740          DEFW 17F5H
2750          DEFB 08H
2760          DEFB 08H
2770          DEFB 08H
2780          DEFB 08H
2790          DEFB 08H
2800          DEFB 00H
2810          DEFW 03F8H
2820          DEFB 09H
2830          DEFB 05H
2840          DEFW 2320H
2850          DEFB 07H
2860          DEFB 07H
2870          DEFB 07H
2880          DEFB 07H
2890          DEFB 07H
2900          DEFB 07H
2910          DEFB 08H
2920          DEFB 00H
2930          DEFW 1E7AH
2940          DEFB 06H
2950          DEFB 00H
2960          DEFW 2294H
2970          DEFB 05H
2980          DEFW 1F60H
2990          DEFB 06H
3000          DEFB 2CH
3010          DEFB 0AH
3020          DEFB 00H
3030          DEFW 1736H
3040          DEFB 06H
3050          DEFB 00H
3060          DEFW 16E5H
3070          DEFB 0AH
3080          DEFB 00H
3090          DEFW 1793H
3100          DEFB 0AH
3110          DEFB 2CH
3120          DEFB 0AH
3130          DEFB 00H
3140          DEFW 1793H
3150          DEFB 0AH
3160          DEFB 00H
3170          DEFW 1793H
3180          DEFB 00H
3190          DEFW 1793H
3200          END
```

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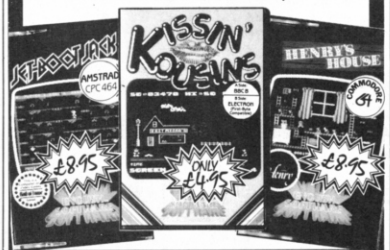

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ON THE MENU

A better organised system is what's on the menu thanks to this routine from Zach Jones that sorts out your disk programs.

When you have a disk full of all of those games from *PCN*, you may find that you get a bit fed up with typing LOAD "SPACE INVADERS", 8 and RUN every time you want to run that particular program.

The program listed here generates a menu of all of the RUNable programs on the disk (the right-hand side of the directory has the letters PRG) and displays these options on the screen ready for selection. The program is then loaded and run.

How it works

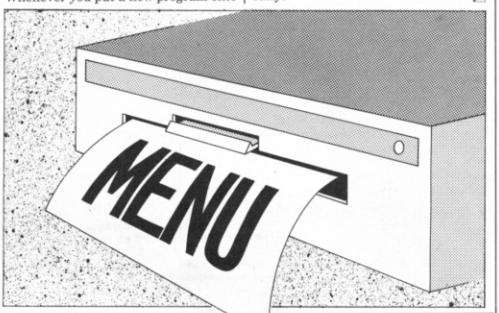
First, the program pauses for one second, waiting for you to hit the letter G. Then it reads the current disk directory and generates a sequential file called MENU.DAT on the disk. This file contains all the names of files with the file type "PRG".

When a normal execution of the program is made, *ie* the G key is not pressed, the program simply reads the file MENU.DAT and displays those options on the screen. A selection is made, and the program is loaded and run.

Using the program

Whenever you put a new program onto the disk that you wish to be available from the menu, run the menu program and use the G option to generate the new menu. The new program can now be loaded from the menu without any further difficulty.

It may be that the programs on the disk are larger than the Menu program. Wherever the END statement is in these programs, simply replace it with a LOAD"MENU",8. Then, when you leave these programs, control will be passed back to the Menu program automatically.



Listing

```
 10 REMOPEN1,8,15,"S:MENU":SAVE"MENU",8:V
ERIFY"MENU",8
 20 POKE53280,0:POKE53281,0:PRINT"[CLEAR]
[WHITE]DISK MENU PROGRAM"
 30 TI$="000000"
 40 GET$:IFG$<>"G"ANDTI$<"000001"THEN40
 50 DIMD$(255)
 60 SP$="
    "
 70 OPEN15,8,15,"UI+"
 80 IFG$<>"G"THEN170
 90 PRINT"GENERATING NEW MENU..."
100 GOSUB420
110 OPEN3,8,3,"@:MENU.DAT,S,W":GOSUB570
120 PRINT£3,K-1
130 FORI=1TOK-1
140 PRINT£3,D$(I)
150 NEXTI
160 CLOSE3
170 PRINT"[CLEAR]MENU OF PROGRAMS"
180 PRINT"----------------"
190 OPEN3,8,3,"MENU.DAT,S,R":GOSUB570
200 INPUT£3,K
210 FORI=1TOK
220 INPUT£3,D$(I)
230 NEXTI
240 CLOSE3
250 FORI=1TOKSTEP20
260 JJ=I+19
270 PRINT"[HOME][DOWN]":FORJ=ITOJJ
280 IFJ<=KTHENPRINTLEFT$(STR$(J)+": "+D$
(J)+SP$,39):GOTO300
290 PRINTSP$
300 NEXTJ
310 IFK>20THENPRINT"MORE... PRESS RETURN
 FOR NEXT SCREEN":GOTO330
320 PRINT"
    "
330 INPUT"[HOME][DOWN][DOWN][DOWN][DOWN
[DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOW
N][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][D
OWN][DOWN][DOWN][DOWN][DOWN][DOWN]RUN WH
ICH ONE [RIGHT][RIGHT][RIGHT]0[LEFT][LEF
T][LEFT]";N
340 IFN<1THENNEXTI
350 IFN<1THEN250
360 IFN>KTHEN330
370 PRINT"[CLEAR][DOWN][DOWN][DOWN][BLAC
K]LOAD"CHR$(34)D$(N)CHR$(34)",8"
380 PRINT"[DOWN][DOWN][DOWN][DOWN]PRINTC
HR$(5):RUN"
390 POKE631,13:POKE632,13:POKE198,2
400 PRINT"[HOME]"
410 END
420 REM READ DIRECTORY
430 K=1
440 B=30
450 OPEN 2,8,0,"$"
460 GET£2,A$ :GET£2,A$ :I$=""
470 IF ST<>0 GOTO 560
480 FOR A=1TOB :GET£2,A$
490 IF A$="" THEN A$=CHR$(0)
500 I$=I$+A$ :NEXT :I$=I$+"  "
510 IFB=30THEN550
520 FORI=6TO27:IFMID$(I$,I,1)<>CHR$(34)T
HENNEXT:GOTO550
530 FORJ=I+1TO27:IFMID$(I$,J,1)<>CHR$(34
)THEND$=D$+MID$(I$,J,1):NEXT
540 IFMID$(I$,26,3)="PRG"ORMID$(I$,27,3)
="PRG"THEND$(K)=D$:K=K+1
550 D$="":I$="":B=32:IFA$<>"S"GOTO470
560 CLOSE 2:GOSUB570:RETURN
570 INPUT£15,EN,EM$,ET,ES:IFEN=0THENRETU
RN
580 PRINTEN,EM$,ET,ES:END

READY.
```

DISENTANGLED DISKS

Put your disks in order thanks to this database program for the Atari. Called Diskfile Manager, it's by D A Dodson and it includes a safety check as well as a search facility.

Diskfile Manager for the Atari is designed to be used as a disk file database. It automatically reads the directory of a disk and creates a file of it on a 'database' disk. It works for all standard DOS directories, and for non-standard directories it incorporates a manual alternative which allows the user to type in titles of up to 11 characters. It should make Atari disk handling significantly easier for you.

When the directory has been input, either automatically or manually, a prompt for a disk number appears. The user then types the number corresponding to the number of the disk from which the directory has been taken, and is then prompted to insert the master disk, which will hold the records.

Failure to install the correct disk won't result in your source disk being overwritten, as the program first checks to see if a failsafe record is present, and re-prompts you if it is not.

The program includes a search facility which allows you to input one or more of the first characters of a known record. You then tell the computer which disk file to start the search from, and it will flag each title/heading with those starting characters. A utilities option allowing you to perform most of the available DOS functions from Basic, *ie* Delete, Lock, Unlock, Rename and Format, is also included.

The listing of the program includes some control characters which should be typed as follows:

Line 270 ¶ Press [Esc] hold [shift] and press [Clear]

Line 330 ↰ Press [Esc] twice, press [Esc] hold [Ctrl] and press [↓]

Line 440 ↰ Press [Esc] hold [Ctrl] and press [2]

Line 1080 ↓ Press [Esc] hold [Ctrl] and press [↓]

Listing

```
10 Clr :Com File$(14),A$(11),Temp$(1000),Name$(20),Ren$(25):File$="D:DI5KFILE."
20 Open #2,4,0,"K:":Poke 710,0:Poke 752,1
30 Gosub 1070:Rem ******INTRO*****
40 ? "**************************************"
50 ? "*            DISKFILE MANAGER        *"
60 ? "*                 by                 *"
70 ? "*              D.A.DODSON            *"
80 ? "*               (c)   1985           *"
90 ? "**************************************"
100 ? :? :? "{1 INTRODUCTION}":?
110 ? "{2 Write Diskfiles.":?
120 ? "{3 Delete Diskfiles.":?
130 ? "{4 View Diskfiles.":?
140 ? "{5 Disk Utilities.":?
150 ? "{6 Quit."
160 ? :? :? :? "Input selection....?";
170 Get #2,K:K=K-48:If K{1 Or K}7 Then 170
180 Gosub 1070:On K Gosub 950,200,600,670,1120,1530
190 Goto 30
200 Rem ***READ***
210 ? "{1 Automatic read":? :? "{2 Manual input"
220   For I=1 To 10:? :Next I
230 Get #2,K:K=K-48:If K}2 Or K{1 Then 30
240 Gosub 1070:If K=2 Then 320
250 ? "Place disk in drive and hit {RETURN}":Gosub 1090:Poke 84,10:Poke 85,38
260 Temp$=" ":Name$=Temp$:Input A$:Gosub 1070
270 Close #1:Open #1,6,0,"D:*.M":? "%          {DRIVE 1 ........}":?
280 Trap 390:  For J=1 To 60:Input #1,Name$
290   Temp$(Len(Temp$)+1,(Len(Temp$)+Len(Name$))+1)=Name$
300   Temp$(Len(Temp$)+1,Len(Temp$)+1)="^"
310   ? Name$;"  ";:Next J
320 ? "Please type filenames pressing {RETURN}":? "after each entry.Press {RETURN} twice":? "to exit...":?
330 Temp$=" ":? "{1 Letters max....!";:Gosub 1090:? :? :? :? :? :Poke 84,7:? " {4.........{4"
340 Input A$:If A$="" Then Goto 390
350 Name$="                    ":Name$(3,19)=A$
360 Temp$(Len(Temp$)+1,(Len(Temp$)+Len(Name$))+1)=Name$
370 Temp$(Len(Temp$)+1,Len(Temp$)+1)="^"
380 Goto 340
390 ? :? :? "-----------------------------------------"
400 ? :? "Replace {MASTER} disk......Then  ":?
410 ? "allocate a number to this {DISKFILE}"
420 Trap 38:Input D:File$(12)=Str$(D)
430 Trap 450:Close #1:Open #1,8,0,"D:LOCK"
440 Close #1:? :? "{2 I THINK YOU HAVE THE WRONG DISKETTE":Goto 390
450 Trap 550:Close #1:Open #1,8,0,File$:Poke 712,178
460 Close #1:Open #1,9,0,File$:Poke 752,0
```

Listing (cont)

```
470 ? "%       Writing DISKFILE ";D:? :?
480   For J=1 To Len(Temp$):X=X+1
490 ' If Temp$(J,J)="A" Then S20
500   Name$(X,X)=Temp$(J,J):? Temp$(J,J);
510     For B=1 To 2:Sound 0,10,12,12:Next B:Sound 0,0,0,0:Next J
520 Trap S30:? #1,Name$:Name$="":X=1:J=J+1:? ;"  ";:Goto S00
530 Poke 712,0:Poke 752,1:? :? :? "       DISKFILE ";D;" Written!":X=0
540 Close #1:Xio 35,#1,0,0,File$:Close #1:Return
550 Close #1:Gosub 1070:? "       DISKFILE ";D;" In use!":Gosub 1090:  For T=1 To 100:Next T
560 Gosub 1070:? "Type (Y) to delete,RETURN to re-select":Gosub 1090:Poke 84,12
570 Get #2,K:If K=Asc("Y") Then Gosub 1070:? "Deleting DISKFILE ";D:Gosub 1090:Goto 590
580 Close #1:Gosub 1070:Poke 84,10:Goto 410
590 Xio 36,#1,0,0,File$:Xio 33,#1,0,0,File$:Goto 450
600 Rem ****DELETE FILES*****
610 ? "Type number to delete/RETURN to exit.":Gosub 1090:Poke 84,12
620 Trap 30:Input D:File$(12)=Str$(D)
630 Gosub 1070:? "Deleting DISKFILE ";D:Gosub 1090
640 Trap 660:Xio 36,#1,0,0,File$:Poke 712,178:Xio 33,#1,0,0,File$:Poke 712,0
650 Gosub 1070:? "DISKFILE ";D;" Deleted!.........":Gosub 1090:  For T=1 To 200:Next T:Goto 600
660 Poke 712,0:? :Gosub 1070:? "  Non-existant DISKFILE":Gosub 1090:  For T=1 To 300:Next T:Goto 600
670 Rem ****VIEW FILES****
680 ? "1 View all.":? :? "2 Search files."
690   For T=1 To 10:? :Next T
700 Get #2,K:If K=155 Then Return
710 K=K-48:If K>2 Or K<1 Then 700
720 If K=2 Then Gosub 1070:? "Input first letter/s to search from.":Gosub 1090:Poke 84,12:Input A$
730 Gosub 1070:? "Type DISKFILE number to start from.":Gosub 1090:Poke 84,12
740 Trap 30:Input D:Gosub 1070:? "Press START to commence...."
750 ? :? "Hold  SELECT to stop......."
760 ? :? "Press OPTION to exit.......":Gosub 1090
770 If Peek(53279)=6 Then ? "%":Goto 800
780 If Peek(53279)=3 Then Return
790 Goto 770
800 Trap 880:File$(12)=Str$(D):Open #1,4,0,File$:? "              DISKFILE ";D:?
810 Trap 870:  For T=1 To 50:Input #1,Temp$
820   If K=2 Then 900
830   ? Temp$(11,Len(Temp$));"  ";
840   If Peek(53279)=5 Then   For T=1 To 20:Next T:Goto 840
850   If Peek(53279)=3 Then Return
860   Next T:Stop
870 D=D+1:Temp$="":? :? :Close #1:Goto 800
880 Close #1:? :? "No DISKFILE ";D;".....":? :D=D+1:If Peek(53279)=3 Then 30
890 Goto 880
900 Rem ******SEARCH******
910 Name$=Temp$(13,Len(Temp$))
920   For J=1 To Len(Name$)
930   If Name$(J,J)=A$(1,1) Then If Name$(J,Len(A$)+J-1)=A$ Then ? "***";Temp$(11,Len(Temp$)):Goto 840
940   Next J:Goto 840
950 Rem ***INTRO****
960 ? "          ******INTRODUCTION******":?
970 ? "In order to use this program you must have a disk on which you will save    your Diskfiles.":?
980 ? "You may use the same disk as the one  containing this program, ";
990 ? "but it is    advisable to use a blank formatted    diskette for maximum storage."
1000 ? :? "Which ever you choose must contain a  failsafe file!. This file prevents youwriting on the wrong disk."
1010 ? :? "To create this file place your blank  formatted disk in drive 1 and hit 'Y'. Any other key aborts."
1020 ? :? "Diskfiles can be allocated any number from 0 to 999 so a record of the      contents of upto 1000 ";
1030 ? "disks can be    stored!........"
1040 Close #1:Open #1,4,0,"K:":Get #1,K:If K<>Asc("Y") Then 30
1050 Trap 1060:Close #1:Open #1,8,0,"D:LOCK":Close #1:Xio 35,#1,0,0,"D:LOCK"
1060 Close #1:Gosub 1070:? "      ******FAILSAFE CREATED******":Gosub 1090:  For T=1 To 200:Next T:Goto 30
1070 Rem *****SCREEN MOVE******
1080   For T=1 To 10:Sound 0,50,10,12:Next T:Sound 0,0,0,0:Poke 84,0:  For T=1 To 24:? "▒":Next T:Return
1090   For T=1 To 12:? :Next T:Return
1100 Rem ***DISK FUNCTIONS*****
1110 Gosub 1070
1120 ? "          ******FILE LIST******":? :?
1130 ? "1 Format Disk.":?
1140 ? "2 Rename File.":?
1150 ? "3 Lock File.":?
1160 ? "4 Unlock File.":?
1170 ? "5 Delete File.":?
1180 ? "6 Write Program to Disk.":?
1190 ? "7 Directory.":?
1200 ? "8 Main menu."
```

27 ▶

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The Zero 2 Robot has arrived. It's the first truly micro robotic system available and remarkably it costs less than £100.

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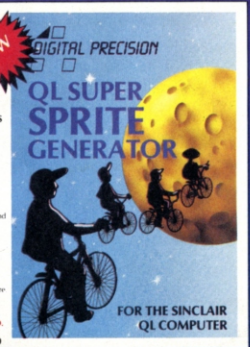

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Listing (cont)

```
1210 ? :? :? "Input selection........"
1220 Temp$="":Temp$(1,2)="D:"
1230 Close #1:Open #1,4,0,"K:"
1240 Get #1,K:K=K-48:If K(1 Or K)8 Then 1240
1250 Close #1:Gosub 1070:On K Goto 1260,1330,1350,1370,1390,1410,1450,40
1260 ? "Place disk to format in drive 1 and  hit RETURN":Gosub 1090:Poke 84,10:Poke 85,15
1270 Input a$:Gosub 1070:? "Disk will be erased ok! (y/n).":Gosub 1090:Poke 84,10:Poke 85,34
1280 Input a$:If a$<>"Y" Then Goto 1180
1290 Gosub 1070:? "Formatting.....":Gosub 1090
1300 Xio 254,#1,0,0,"D:":Gosub 1070:? "Done.....":Gosub 1090:  For T=1 To 100:Next T:Goto 1180
1310 ? "Place disk in drive 1 and hit RETURN":Gosub 1090:Poke 84,10:Poke 85,38
1320 Input a$:Open #1,4,0,"D:D05.SYS":Close #1
1330 ? "Please type oldname,newname.":Gosub 1090:Poke 84,12
1340 Trap 1520:Input #1;en$:Temp$(3,3+Len(en$))=en$:Gosub 1070:? "Renaming.....":Gosub 1090:Xi=32:Goto 1440
1350 ? "Input the name of the file to lock":Gosub 1090:Poke 84,12
1360 Trap 1520:Input #1;en$:Temp$(3,3+Len(en$))=en$:Xi=35:Goto 1440
1370 ? "Input the name of the file to unlock":Gosub 1090:Poke 84,12
1380 Trap 1520:Input #1;en$:Temp$(3,3+Len(en$))=en$:Xi=36:Goto 1440
1390 ? "Input the name of the file to delete":Gosub 1090:Poke 84,12
1400 Trap 1520:Input #1;en$:Temp$(3,3+Len(en$))=en$:Xi=33:Goto 1440
1410 Trap 1430:? "Saving program to disk.....":Gosub 1090:Save "D:FILE1T"
1420 Gosub 1070:? "Done.............":Gosub 1090:  For T=1 To 100:Next T:Goto 1180
1430 Gosub 1070:? "Can not save to disk.....":Gosub 1090:  For T=1 To 100:Goto 1180
1440   Trap 1520:Xio Xi,#1,0,0,Temp$:Gosub 1070:? "Done.....":Gosub 1090:  For T=1 To 100:Next T:Goto 1180
1450   Rem ***DIRECTORY*****
1460   ? "Insert Disk to read.Hit RETURN....":Gosub 1090:Poke 84,10:Poke 85,38
1470   Input a$:Gosub 1070
1480   Close #1:? "{CLR}                DIRECTORY":? :Open #1,6,0,"D:*.*"
1490   Trap 1500:  For J=1 To 50:Input #1,Name$:? Name$;"  ";:Next J
1500   ? :? :? "----------------------------";?
1510   Close #1:? "Hit RETURN for menu.....";:Input a$:Goto 1180
1520   Gosub 1070:? "{CLR} File not found.....":Gosub 1090:  For T=1 To 100:Next T:Goto 1180
1530   New
```


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TOWER ABOVE THE REST

A big, absorbing adventure kept Bob Chappell glued to his computer.

One of the great things about adventures is that they let you escape for an hour or two from the worries and monotonies of everyday life. One minute you're plain and simple Fred Bloggs of Mafeking Terrace, doing nothing more exciting than crazy paving your window box or cleaning out a blocked drain. The next minute you could be Zon, uncrowned King of the Silver Mountains, single-handedly bashing up a band of Orcs with a rusty dagger and an unlit oil lamp.

The greater the attention to detail and atmosphere, the easier it is to absorb yourself in the fantasy. A good example is *Tower Of Despair* (£7.95, Spectrum), a superb new text adventure from Games Workshop. It positively overpowered me with its lovingly created atmosphere and carefully detailed prose.

There I was, a jaded, blood-shot-eyed reviewer with not so much as an Esquire after my name. But with one bound (to the keyboard) I became Warrior Mage of Castle Argent, Warden of the Eastern Marches of Aelandor, Keeper of the Silver Gauntlet, Wielder of Flamebolt the Staff of Lightning Bolts, son of Thorvald the hero.

Thorvald, my pater, had been killed by the evil sorcery of Malnor, the Screaming Shadow, but not before Pop had sealed Malnor in Limbo. Wouldn't you just know it — Malnor has somehow danced out of Limbo (sorry) and is once again plotting dark deeds from his lair in the Tower of Despair. You must reunite the Silver Gauntlet with the Gold Gauntlet that lies in the Eastern Wilderness — only then will you be strong enough to toddle along to the Tower and marmalise Malnor.

Tower illuminations

Although this is supposed to be a Quill-based adventure, you'd have a hard time recognising it as such. For example, the redefined character set has been beautifully designed, with some capital letters decorated like those in old illuminated manuscripts. A small shield appears as your non-flashing prompt.

The descriptions are full and imaginative and the command analyser fast, flexible and comprehensive.

I began in the Inner Sanctum of Castle Argent. The accompanying booklet provided maps of both the castle and Eastern Aelandor, as well as giving background information and 16 black and white pictures of major scenes. Being lazy, the first thing I typed was HELP and was told 'I can't help you this side of the river. Sorry.' Well, that's better than the usual 'You're on your own here.'

Although the instructions say that LOOK will repeat the location description, you actually have to say LOOK ROOM, while LOOK object-name often reveals further information about an item — a repeat look at the Inner Sanctum revealed something not previously exposed.

Rune juice

Even though I hadn't seen one, I tried GET ROPE only to be told 'Find it then!' Games Workshop is obviously on its toes. I did find a blue dagger though, and LOOK DAGGER revealed 'The dagger is perfectly balanced and intricately decorated, and is inscribed with Old High Runes reading "Stealth Conquers Fate"' — juicy stuff, eh?

You are not told what exits there are from a location so experimentation is the order of the day. Upstairs I found the main bedroom: 'You are in the main bedroom which is a veritable mess as you did not sleep well. One of the servants is in here, cleaning up'. Aha! Methinks I'll SAY HELLO to this fellow. 'You can't, I'm afraid: Donnchadh your valet is a deaf-mute.' Foiled! — or was I? There's more cunning to this program than meets the eye.

Elsewhere I discovered a strange-looking globe. Being an inquisitive cove, I just had to take a closer look at it and, shades of Tolkien's *Silmarillion*, was met with: 'You place your hand upon the orb and sense the Council's message, still resonating within .... but wait! It is gone. Malevolence rushes through you, deepening as the sphere blackens throughout. Eyes, redly glowing like dying coals, glare balefully at you. Malnor is 'listening'! A hideous ululating scream rends the air and . . .' — and that's all I'm prepared to divulge.

Tower Of Despair should appeal to all adventurers. The plot is strong, the atmosphere thick, the puzzles punishing. The adventure is big, so big it's in two parts, one to each side of the cassette. One of the most absorbing adventures around and excellent value for money.

Dungeon aid

Poor Conn Iggalden of Ruislip is bogged down at the start of Phipp's *Knight Quest*. I have some sympathy — it's a great adventure but a tough one. Try this:

1 DROW SWAR DTSU MOUY THGI FUOY EROF EB

2 RAB LEETS HTIW GNITARG NEPO ESIRP DNA SEVAEL EVOM TSEROF NI

For those newly awake in the coffin in Level 9's *Snowball*:

1 NRUT NISN OTTU BSHS UP:N ;TUO :REV ELHS UP

2 ?UO: ROOD NEPO :TIA W:N; YRAU TROM OTPU :NIF FOCO TNOP U;S

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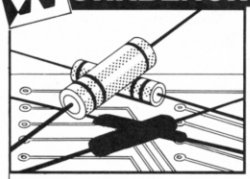


PROJECT 2

In the second of PCN's new Workbench series Kenn Garroch shows you how to provide the BBC Micro with a better speaker and a few other improvements as well.

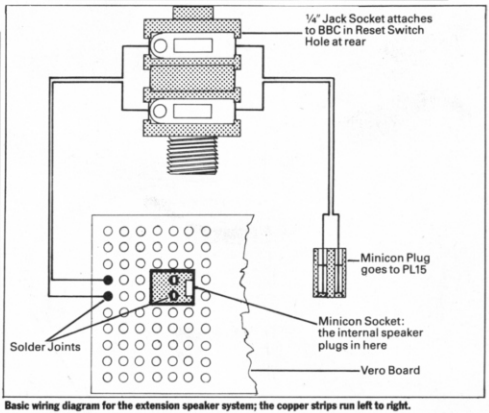
The quality of sound from the BBC Micro has much room for improvement. For instance, the internal speaker is too small. Getting around this drawback is pretty straightforward; as the micro's speaker plugs into the main circuit board at PL15, a replacement can also be plugged in at this point, as long as it matches the 8ohm impedance.

While we're at it, a few other features can also be added: a plug-in system that means no modifications to the BBC itself; and a socket arrangement that allows the internal speaker to be available when the external one is absent.

The first step is to take the Vero board and solder the Minicon socket onto it. Next, cut the two metres of cable into three pieces 40cm, 20cm, and 140cm long. Two of the Minicon terminals should be clamped and then soldered to each of the wires at one end of the medium sized cable after baring and tinning it. The other end of this wire is bared and soldered onto the ¼in jack socket.

Of the two pairs of connectors on this socket, the pair with the spring levers should be attached to this wire. The other pair is attached to the two wires at the end of the smallest length of cable. The other end of this cable is attached to the Vero board in holes adjacent to the Minicon socket, on the same strips.

The largest length of cable is attached at one end to the speaker, and at the other end to the ¼in jack plug. The best way of doing this is to place the plug in a vice before you attempt to solder it, or you may singe your fingers. All the hard work is now over.



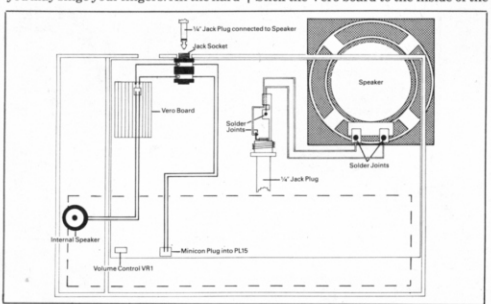
Basic wiring diagram for the extension speaker system; the copper strips run left to right.

On the right-hand side of the back of the micro are two holes: one for the Econet connection, the other for a reset switch. The ¼in jack socket should be placed in the reset switch hole. Many later versions of the BBC Micro have this hole covered by the thin black plastic on the back of the machine. Just use a small sharp knife to reveal the hole.

Boot-up beep

Stick the Vero board to the inside of the case next to the power supply with double-sided tape. Push the internal speaker plug onto the Minicon socket, reassemble the micro and turn it on. If you don't hear the boot-up beep, turn everything off and check the connections. If all is well, plug the external speaker into the socket at the back and hit CTRL+G. Again, you should hear a beep, but much better than before.

If you want to alter the volume, the small preset potentiometer next to PL15 can be adjusted with a small screwdriver. It's pretty easy to remove the keyboard to do this. A further way to improve the sound is to build a box for the speaker.



This diagram shows the fitting of the extension to the BBC Micro, and the wiring of the speaker to the ¼in jack plug.

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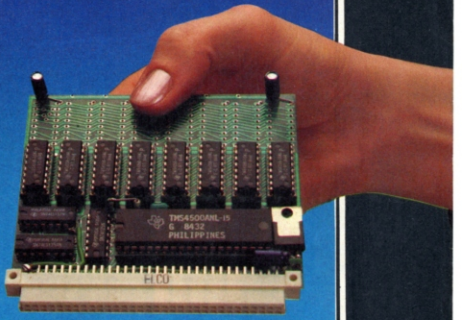

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Taking price first, it is difficult to find a computer system which offers better value than the Memotech FDX Twin Disc.

Included in the ***£1490.00*** *(inc.VAT) price tag are the MTX512 64K RAM computer, the twin RS232 communications board, the FDX disc drive unit with two double-sided double-density drives and colour and monochrome outputs, a high quality monochrome monitor and the Memotech DMX80 printer.*

But that's not all, since each machine has "bundled" with it several powerful software packages – including ***CP/M 2.2****, the industry standard operating system. NewStar Software's* ***NewWord Word Processing Package****, one of the newest and most sophisticated word processors currently available, has a mailmerge facility built into it, so that producing mail shots (or any form of mass mailing) to customers is something the machine takes care of on its own – the mailmerge package can even make decisions on which letter to send to which customer. NewWord's "what you see is what you get" feature makes laying out of text simplicity itself.*

Also included is ***SuperCalc****, by Sorcim Inc., a powerful "spreadsheet analysis" package that allows complex calculations and unlimited adjustments to be made to financial and other data – at the press of a key. "What if" questions about the future direction of a business become simple to answer and absolutely accurate.*

CONTACT *is a communications package which not only allows the Memotech computers to communicate with each oth but also with any mainframe, giving the user access to database information which is closed to other machines.*

OVERLAY8 *configures the Memotech FDX to accept a standard Televideo format disc, opening up the wealth of existing business software running under CP/M.*

Memotech Disc BASIC *has all the powerful Graphic and "window" commands which are in standard Memotech BASIC.*

COMPAT*, which is available separately from Memotech, allows the FDX system to read data files in over 50 different formats – including IBM PC.*

Many different disc system configurations are offered as "off the shelf" packages, for example:

FDX Twin 5.25" Floppy Drives

This configuration, mentioned above, provides two 500K Qume drives, and two additional boards, which are the 80 column screen board, and Floppy drive controller board, allowing each of the Qume drives to be configured, through CP/M 2.2, as any of thirteen CP/M types.

FDX Single 5.25" Floppy plus 256K Silicon Disc

The Memotech Silicon Disc offers unparalleled speed and convenience of data access. Because of this, files can be copied into the Silicon Disc, manipulated at high speed, and then recopied back onto floppies. Find and replace commands, used within MTX NewWord for example, are virtually instantaneous. Also provided is Sispool, a Silicon Disc print Spooler, which allows files on the Silicon Disc to be printed out in "background", so that the computer can print a high quality copy of a finished file to a daisy wheel printer, and at the same time print a different file to a "draft" quality printer.

FDX Single 5.25" Hard Disc plus Single 1Mb 5.25" Floppy

This configuration, designated the Memotech HDX, offers mass storage facilities of either 10 or 20 Megabytes. The HDX Hard Disc System runs at a processor speed of 8 Megahertz, and is consequently much faster than other commonly available systems.

Memotech DMX80 Printer

The DMX80 provides an ideal means of producing hard copy from any of the MTX Series computers. It prints at a speed of 80 characters per second, has fully programmable hi-res graphics capabilities, seven character sets and tractor/friction feed.

For further information, please contact:

MEMOTECH

MEMOTECH LIMITED STATION LANE INDUSTRIAL ESTATE
WITNEY OXON OX8 6BX
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Televideo is a registered trademark of Televideo Inc.
SuperCalc is a registered trademark of Sorcim Inc.
NewWord is a registered trademark of NewStar Software Inc.

WATCH THIS

Seiko has squeezed a micro into a wrist-borne terminal that hooks up with your computer. Kenn Garroch gives it a wearer's test.

In this age of ever smaller, ever more powerful microelectronics, Seiko has come up with what might be the final reduction — in size that is. The RC-1000 wrist terminal is a watch-like device that can be hooked up to a computer via an RS232 and have information downloaded to it.

Once in, that information can be used in a number of ways; to set up timed alarm signals, memos and world time zones for example. The terminal comes with software to run on your micro if you have a Commodore 64, BBC, Spectrum, Apple, Tandy Model 100, IBM PC or PX-8.

First impressions

The RC-1000 looks like any of the standard wrist watches available from the shops. The display consists of two rows of 12 characters which normally show the time, date, day, am/pm and alarm on/off. So far it's just a pretty sophisticated watch, apart from six buttons on the front labelled time, lock, alarm, select, terminal, and set.

At the bottom of the box the RC-1000 comes in are two packages, one of which contains the interface lead, the other a disk and instruction manual. The review model had an interface and software for the Commodore 64. The software is also available on cassette for several machines and this costs about £10 less.

The whole system strikes me as one of those zany Japanese ideas like the tape recorder with three decks, a record player, television, video, musical keyboard, drum synthesiser, etc all built into one machine. That said, it could be pretty useful.

In use

Getting the software started on the 64 was fairly straightforward. When the disk had loaded I was confronted with a fully menu driven program that enabled me to set up alarms, memos, and world time zones.

Using the software was unusual rather than difficult. The menus were taken a little too far and I felt like I was controlling a watch where the number of keys was limited, not a computer with a full keyboard.

Perhaps this is just a personal preference but I think there is room for improvement.

After downloading a few dates and phone numbers, I started wearing the watch full time. The comments it drew ranged from 'gauche', this was from a Yuppie whom I ignored, to 'neat', from a gadget freak friend of mine. The general consensus of opinion was that no one could think of a use for it.

As a person who can't be bothered keeping a diary, I found it quite useful. Setting alarms for appointments, getting me out of bed and telling me when to finish work (I can't be the only one who forgets all these things) worked quite well.

Up to 80 2×12 character screens can be held in the watch at any one time, and the software provides a complete filing system allowing a database to be set up and then modified as necessary. The idea seems to be that once you have your basic alarms, phone numbers and messages set up, all you will need to do is alter the more ephemeral ones once a week or so. It's as simple as that.

Downloading the information to the watch entails removing it from your wrist, attaching the clip to an RS232 interface and putting the watch into receive mode. Selecting download from the menu loads up the watch/terminal. Depending on how much information you are transferring this can take anywhere from 10 to 20 secs.

Once the data is installed in the watch, it can be examined with the Terminal and Select/Step buttons on the front of the watch. Terminal steps through the various headings, the other two step through the information under the headings.

When any of the alarms go off, the message that goes with it is displayed on the watch face. Pressing any key stops the alarm and returns the watch to time mode. The alarm tone is a high pitched beep-beep-beep which just about penetrates the consciousness in the morning

Documentation

Two small manuals come with the RC-1000. The first tells you how to operate the watch and access all of the functions and displays. It is much the same as any other watch manual. The second covers using the software. Most of this seems to apply to Apple software, but there is a table giving the commands for other computers.

At the back of this booklet is a fold-out map of the world giving all of the time zones and the major cities in them.

What I expected to find, but couldn't, was any information on how the RS232 interface is controlled, and what protocols are needed to set up a system. This is a sad omission.

Verdict

The RC-1000 may appear to be a little Micky Mouse, but Seiko isn't aiming the wrist terminal at just the home market. There is software for the IBM PC, PX-8 and Tandy Model 100, so obviously the idea is to sell it to the professional market. Indeed, it is probably of more use to the high flying business executive who has to be in several places at once than most other people. At £119 it is about the same price as many of the other up-market watches, so the additional features and software are quite reasonable. As a novelty, it's good, as a useful tool for the gadget-loving businessman, it could become indispensable.

REPORT CARD: 1 TO 5

Features	●●●●
Documentation	●●●
Performance	●●●●
Overall value	●●●

Name Seiko Wrist Terminal **Price** £109 (approx) cassette, £119 disk **Outlets** High street stores in about eight weeks.

The Seiko radio link RS232 simply clips onto the back and allows you to connect a variety of computers.

64K User RAM
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MTX 512
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The MTX512 comes with 64K RAM, expandable to 512K. Add to this another 16K VideoRAM dedicated solely to handling the screen memory, and you've got 80K. But how much user RAM is left when you're running high resolution graphics programs? Unlike other machines, the answer is still 64K, because the MTX512 uses the 16K VideoRAM plus a second processor – the Texas TMS9929A – to take care of screen graphics. The main processor used in the MTX512 is the Zilog Z80A, which gives the MTX Series CP/M compatibility – CP/M was written around the Zilog Series. And the Z80A inside the 512 operates at 4MHz.

Expansion is no problem with the MTX Series, because it is designed as an interlocking system – from the MTX512 up to the powerful Memotech Silicon Disc Systems.

MEMOTECH MTX512 MAJOR FEATURES

STANDARD I/O PORTS

- Variable rate cassette port (up to 2400 baud)
- Two joystick ports using Atari configuration
- Centronics-type parallel printer port
- ROM cartridge port
- Uncommitted parallel input/output port
- Internal ROM board port
- Hi-Fi output port
- 4-channel sound through TV speaker
- PAL composite video colour Monitor port

THE RS232 COMMUNICATIONS BOARD

(required for disc expansions)

- Two independent RS232 ports
- 60-way Disc Drive Bus supporting up to four 5.25 and/or 8 inch floppy disc drives, Memotech Silicon Discs, and Hard Discs

USER RAM

- Expandable to 512K in increments of 64, 128, or 256K

24K OF ROM *which includes:*

- MTX BASIC
- Noddy, a simple, text-handling language
- A powerful Assembler/Dissassembler – sections of machine code can be created and run by calling the Assembler from within BASIC
- The sophisticated Front Panel, which displays the contents of all registers (including the F flag register) and pointers during program execution
- All four languages can be used interactively with each other, and with the user

ROM EXPANSIONS

- MTX NewWord, a 32K word processing package
- Hisoft PASCAL, written specially for the MTX Series

THE KEYBOARD

- Full size, 79-key, full-stroke professional quality keyboard incorporating:
- Main Block with typewriter-style layout
- A separate 12-key numeric/editor keypad
- Eight programmable function keys (16 with shift)

GRAPHICS FACILITIES

HI-RES GRAPHICS MODE

- 256 × 192 pixel resolution plus
- 32 × 24 Text in 16 foreground and background colours
- All 16 colours (i.e. 15 colours plus transparent) are available on the screen together
- 32 user-definable easily controllable sprites
- 128 separate GENPAT statements providing a huge range of user-defined characters

TEXT MODE

- Text resolution is 40 × 24 characters plus
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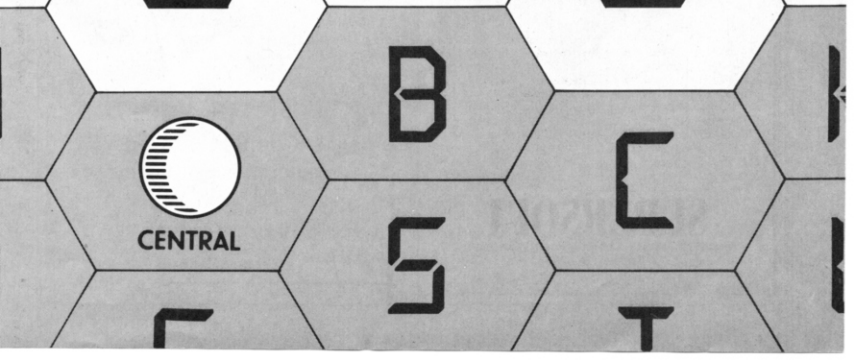

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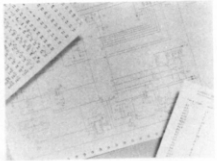

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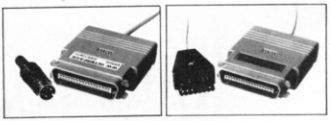

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USER RAM

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24K OF ROM *which includes:*

- *MTX BASIC*
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- *A powerful Assembler/Dissassembler – sections of machine code can be created and run by calling the Assembler from within BASIC*
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- *32 × 24 Text in 16 foreground and background colours*
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- *32 user-definable easily controllable sprites*
- *128 separate GENPAT statements providing a huge range of user-defined characters*

TEXT MODE

- *Text resolution is 40 × 24 characters plus*
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SOFTWARE PRE-VIEW

We check out the latest contenders on the software market. Don't forget, if you want your company's package to be included on this page, send your latest releases to Bryan Skinner, *PCN*, 62 Oxford Street, London W1A 2HG, along with prices and 'phone numbers.

ATMOS/ORIC

Macro Assembler looks a boon for any serious Oric programmer. The package doesn't just include a full two pass 6502 macro assembler, there's also a monitor and a suite of Basic commands like renumber, compact, block line delete etc. The only drawback is that you'll need ITL's Byte Drive to run it.

Macro Assembler	**£19.00**	**McLaughlin 0742-470094**

COMMODORE 64

Shadowfire is another surprise from Beyond. To be released on April 17, it's nothing like any of the company's other games. It has superb graphics and will probably do well, but I wasn't very impressed.

You're in control of a team of 'tough future heroes' on a mission to rescue a kidnapped ambassador. All input is via icons, so to move you select a character, then its movement monitor, then the direction and so on — tedious.

Initial impressions are that the backing music is good, but repetitive, the action slow and the game on the dull side. But we'll let you know what prolonged exposure feels like very soon.

Rock 'n' Bolt is a strange game which I don't see many buying. It's one of those mental-shape-puzzles like tangrams. The idea is to amass points by fixing girders together according to a blueprint. The girders are sliding rectangles onto which you can jump, and pressing fire fixes a girder in place.

The blueprints and the girder arrangements get more complex as you progress, some stretching over three screens.

Rock 'n' Bolt	**£10.99**	**Activision 0628-75171**
World Series Basketball	**£6.95**	**Imagine 061-832 6633**
Shadowfire	**£9.95**	**Beyond 01-837 2899**

SPECTRUM

Death Star Interceptor is the final scenario of *Star Wars*. It's not quite as good as *3D Star Strike*, and is closer to the arcade game. It's a decent, two-and-a-half screen shoot-'em-up with neat graphics. First you have to take off through a portal (that's the half screen — a piece of cake after a couple of bashes). Then you're on your way to the looming Deathstar, facing waves of fighters.

This is probably the best bit — the fighters wheel out of the Deathstar and their perspective animation as they snake toward you is superb. Finally it's down the long channel, dodging this and that, and hoping for a direct hit on the reactor port.

Death Star Interceptor	**£7.95**	**System 3 01-587 0873**
Froggy	**£6.95**	**R&B 0704-41336**

BBC

Tomorrow's Dream is better known for its Spectrum and BBC debugging monitors. In *Sub Strike* you control the submarine, trying to blast hordes of attacking helicopters. The game gets harder very quickly, with guided missiles, mines and deadly marine beasts to contend with.

Sub Strike	**£6.50**	**Tomorrow's Dream 0272-47860**

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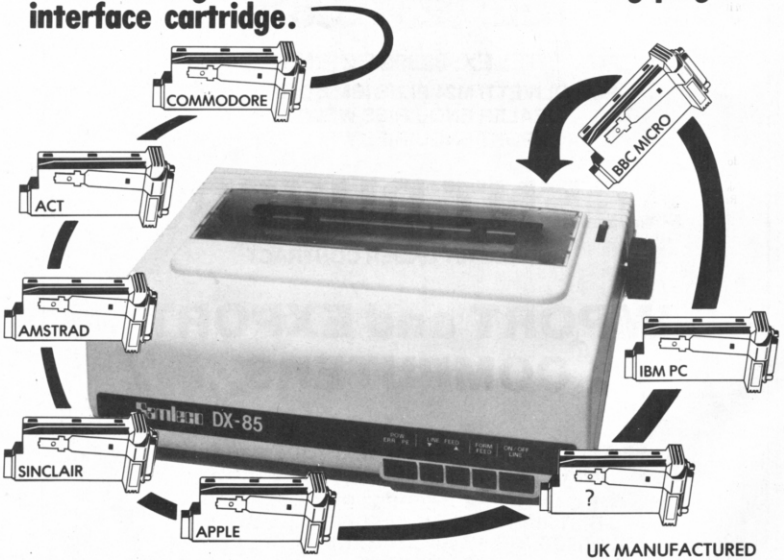
Speed: 120 cps, bi-directional, short line seeking. Columns: 80 to 136, (at 17 cpi). Matrix: 9 x 9. Character set: Full 96 ch ASCII with 11 language variants. Graphics: Uni-directional, bit image. Forms handling: Forward/reverse with programmable line spacing. Interfaces: Centronics parallel, RS 232 serial, Commodore. Size: Width 370mm, Depth 280mm, Height 130mm, Weight 6kg.

Suitable for direct connection to all leading PCs and Business micros using plug-in interface cartridge.



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GAMEPLAY

SPECTRUM

DRAGONTORC OF AVALON

STAR GAME

This isn't another Captain Sensible single but Hewson's successor to the very popular *Avalon*, described by the company as an *adventure movie*. From the same author, Steve Turner, *Dragontorc* continues the adventures of Maroc. This time Maroc must rescue his old tutor Merlin from the evil clutches of trickily named Morag the Shapeshifter.

Morag, the Witch Queen of the North, has also managed to lay her gnarled hands on one of the five crowns of the British Isles. With all five she can remake the powerful Dragontorc and gain sovereignty of the British Isles.

The first thing you notice about the supplied map is the extent of the playing area, and how much more varied than *Avalon* it promises to be: ruined castles, Torhenge, the Trollstones concealing Hellsmouth Cave, Wispwood Forest where the lost vaults of Locris are hidden, and many, many more, culminating in Morag's Citadel near the Wyrmwood somewhere in Scotland.

The screen has the same design as *Avalon*: a playing area at the top containing simplified but effective 3D style graphics, with a scroll beneath where information is displayed. You move the astral body of Maroc by keyboard or joystick.

You can load a saved game if you wish — an essential facility as you must progress through no less than 64 levels, from Apprentice Magician to Supreme Lore Lord, and you won't do that in one sitting.

You begin next to a roaring fire in the depths of Wispwood Forest, and the spells of Bane, Move or Servant at your disposal. You select the one you want by scrolling the scroll they're displayed on and using the fire button. *Move*, the most frequently used spell, allows you to 'transport thy soul' around the various screens.

Servant summons up your friendly tadpole-like sprite who moves about independently, removing and replacing items from your capacious back-pack, and investigating other objects. *Bane* is the Wraithbane spell; as in your actual adventure, it's up to you to discover where and how you can make use of this.

Dragontorc really does combine arcade and adventure as you discover on exploration of the first forest. You know the entrance to the lost vaults of Locris is hidden here, but you must piece together clues from the scenario that comes with the game, and experiment with different objects to see which, if any, opens the vaults.

There are also Wisps and Elves wandering round the place, and you see whether these are to be traded with or defeated: your remaining energy is indicated by a dragon's head at the foot of the screen.

In the Wispwood you move from one screen to the next down gravel avenues, while in the lost vaults we're back with the old doors to open and skeletons to grapple with. By this time you should have extended your magic repertoire and a quick spell-check might reveal an effective weapon against those accursed skeletons.

I found a variety of new objects in the vaults, including three chests, two of which were locked. When I opened the third I was nabbed by a particularly nasty spider, although I did survive clutching a key to one of the other chests, where two spiders promptly arrived to chase me round the room. Regrettably the spells in my backpack didn't include any patented aerosol bug-blaster, and nor was my servant much use as the spiders were bigger than him.

Only two minor problems surfaced in the first few plays: one is the difficulty of controlling Maroc, as in *Avalon*, with doors closing in your face when you try to go through them; the other is the irritating wait through a lengthy musical interlude between games.

On the plus side, when you die you're resurrected somewhere in the area that you'd reached, though you must reach the actual place of your demise to retrieve the objects you were carrying with you.

Sequels frequently disappoint, but in my limited experience as a minor magician, *Dragontorc* achieves the near-impossible feat of being even better than *Avalon*. Avalook yourself. **Mike Gerrard**

Price £7.95
Publisher Hewson Consultants
0235-832939

COMMODORE 64

SEASIDE SPECIAL

Oh, I do like to be beside the seaside — but not if it's like the one Taskset has dreamed up.

As Radium Rodney (now there's an unsubtle clue), you must collect radioactive seaweed from Rot Away Beach. Then it's off to Downing Street where he engages in a bout of seaweed slinging at the windows of No 10.

The reason for Rodney's anger is that evil Politikians have arrived from outer space and disguised themselves as Prominent Cabinet members. The plot, like the seaweed, is, well, weedy.

Down on the beach the tide rolls in and out with a hiss. When it rolls out it leaves behind several mounds of the hot brown weed. Dodging assorted crabs, jellyfish, clams and guards, Rodney has to gather up the revolting stuff. Once he's amassed at least ten clumps, he can hop off to the capital on screen two.

From the windows of No 10 alarmingly familiar faces appear at random. Rodney lobs the weed in their general direction before the occupants dis-

appear back behind the curtains. Government bashers should love this.

And that's it. The game may not be intellectually stimulating, offer a wide variety of challenge or call for strategic planning but you can't say it's not original. However, although it's well executed, there's not enough game to persuade me to splash out. There's plenty more fish in the sea for me to try out. **Bob Chappell**

Rating 6/10
Price £6.90
Publisher Taskset
0262-673798

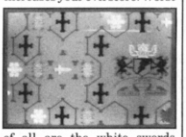
COMMODORE 64

ICE PALACE

Ice Palace is the latest little dazzler from Creative Sparks. It's an arcade-adventure, but tackles its schizophrenia in a novel way.

There are two playing screens; you switch from one to the other with the space bar. The arcade screen shows an aerial view of your immediate surroundings. Each hexagonal 'room' has one or more openings, so sometimes there are double-skinned bulkheads in your way. However, pulling back on the joystick rotates the walls of each room.

All movement takes place on the arcade screen. Impassable rooms are easily recognised by large black crosses or lakes. From time to time yellow blobs, ghosts, eagles and other evil nasties fly past. Hit them if you can; contact is dangerous, as it increases your evil score. Worst



of all are the white swords which materialise, spin, then set off at breakneck speed.

Hazards can be destroyed with the firestick. A fireball, released when you press fire, can be steered around the screen.

Rooms with yellow swords are the best places to switch over to the adventure screen. This is largely taken up by two panels. The left gives you a scrolling list of possible actions (such as get, sharpen, put on left pan etc). On the right are objects carried, or items in the room. Verb-noun pairs can be entered by highlighting relevant items, then choosing an action.

At top right is a candle whose height shows how long you've got left, while top centre there's a vertical gauge crossed by a dotted line. It bears the legends Good and Evil, the latter being at the bottom.

After each wave of nasties, heralded by some atmospheric music, a spinning column appears. Get in this and your goodness rating climbs. There's also a skull, whose eyes flash when you're under attack and a firestick which turns grey when it's low in fuel.

At top left is a crown. The purpose of the game is to collect all the pieces of the crown.

Ice Palace is very different from most other 'arcadventures'. The format for both its game types is simple (and therefore rather restrictive), and the graphics aren't anything to write home about, but it's unusual, nicely implemented, addictive and deserves to do well. **Bryan Skinner**

Rating 8/10
Price £7.95
Publisher Creative Sparks 0252-543333

GAMEPLAY

ATARI

DROPZONE

STAR GAME

After a dearth of Atari-only releases in the UK, it was with high anticipation that I loaded up this new game from the US Gold stable.

Dropzone was well worth the lonely vigil — it's a humdinger. Although basically a reworking of our old friend *Defender*, the game has a lot of new material and is the best Atari all-action shoot-out I've seen in many a moon.

You fly a space craft at light speed over a planet surface, zap assorted aliens and rescue your beleagured buddies.

However, it's you that's flashing around the heavens, clad in a natty rocket-powered space suit. And instead of a boring old zig-zagging line representing mountainous terrain, you get a high-resolution,

fully-detailed layout of the planet's buildings and surface as a fighting background.

Foreign bodies abound. Some begin as a gnat-cloud of molecules that join up to become one of several species of adversary. Planters and Nemesites are green, gyrating, non-intelligent, bug-eyed pods. Nmeyes are vicious, pink blancmanges which home in on you unerringly.

Even more diabolical are the Blunder Storms, Spores, Trailers and Anit-Matter, all with their own special characteristics and all out to make your sojourn as brief, but as memorable, as possible.

Your spaceman can fire furious non-stop bursts from his laser gun while three smart bombs (which destroy every nasty in sight) come in handy in a tight corner. A temporary cloaking device lets you pass unhindered through the gathering swarms of aliens to continue your mission.

The main aim is to rescue little starfish-shaped men and drop them into a safe building on the surface. There are many successive waves to pass through, each wilder than the last.

Movement of aliens, landscape and the hero is silk-smooth, the pace fast and frantic. The sound effects and graphics are superb. When your spaceman is hit, he turns orange, pulsates briefly, then explodes loudly into a glorious starburst.

For excellent sound, brilliant graphics and a great all-action challenge, shop around no more. *Dropzone* will have you on the edge of your chair and shredding your lower lip. Never mind the aliens, you'll be the one that's bug-eyed. A wow.

Bob Chappell

Price £9.95 (cassette), £14.95 (disk) **Publisher** US Gold 021-359 3020

SPECTRUM

STAY KOOL

Manic Miner clones such as *Stay Kool*, the latest from Bug-Byte, are still being released even though there are almost more than enough already.

As Luke Warm, space pilot, your task is to find and collect fuel rods for your shuttlecraft so you can leave your crippled spaceship which is hurtling into a nearby star. This puts a time limit on the game represented by the rising temperature — stay cool, Luke.

It all boils down to a platform game in the classic tradition. There are levels which dissolve as you traverse them, tiny platforms which require skill and patience to reach and, of course, a host of hazards. These vary from deranged robots to escapees from Luke's space monster menagerie. The mobile problems take predictable paths, so learning a new screen is not difficult.

You can brush against a lethal nasty in mid-leap, only to find you're still okay, thanks to the generous collision detection. Similarly, you don't have to be perfectly placed to climb ladders or use the transporters.

As with many of its predecessors, the locations have wacky

names, *eg* The Surgery, The Sewage Fermentation Plant and The Pteradactyl's Lair (why is it that programmers are so poor at spelling?).

The animation is good, there are chomping monsters, bubbling test tubes and rippling thingumibobs; even Luke swings his arms as he hastily seeks out the flashing.

But what more can you say *Stay Kool* is a competent, not too tricky, version of something you've probably played a hundred times.

Bryan Skinner

Rating 7/10
Price £6.95
Publisher Bug-Byte 051-709 7071

SPECTRUM

ALIEN 8

If *Knight Lore* didn't already exist to prove it, we'd all be raving about *Alien 8*, and asking if such graphical magic were really possible on a Spectrum. But thousands of people have already bought *Knight Lore*, so will they spend another ten quid on basically the same game? The answer might not be a lemon, but it could be a resounding first raspberry for Ultimate.

The story exchanges old-fashioned werewolves for a new-fangled robot which you negotiate round the innumerable rooms of the Alien 8

spacecraft. You have a mere 6,000 light years to complete a variety of tasks if you're to save the Alien 8, but your first hurdle is to find the tasks.

The glossy manual tells you that you must locate and activate all cryogenic chambers and ensure all thermolec valves are in the correct sockets. But as you can't initially tell a thermolec valve from a thermal vest all you can do is waddle down the corridors and hope for the best.

As before, you can begin each game in one of several different locations. Each has several doorways which lead to other rooms with a variety of inhabitants, problems, structures and further doorways. Map-makers to the fore, but instead of rooms with ghosts you'll come across rooms with clockwork mice — I've also found a lump of cheese (seemingly not clockwork) but haven't yet got it to the mice to see what effect it has on them.

Control is as before, with keyboard, Kempston, cursor joysticks or Interface II options and with its crumbling blocks, walkways, and one-way leaps, *Alien 8* is simply *Knight Lore II*.

Mike Gerrard

Price £9.95
Rating 7/10 **Publisher** Ultimate 0530-411485

COMMODORE 64

MAMA LLAMA

This new release from Jeff Minter may be technically brilliant but it takes more than technical pyrotechnics to make a good game, as I discovered.

Supervising the whole thing is an options menu where you can select any of five alien types (Rory makes a reappearance) with six pre-set parameters (time, shields, alien generation rate, etc).

The first of the game's two sections is a strategy grid where you move symbols around to select the wave you tackle. Each symbol represents a type of planetary surface. There are five different symbols including, not surprisingly, a camel and a llama. The colour tells you roughly how many aliens to expect.

The longer you take to select your wave, the more the aliens build up in the unselected squares, even to the extent of creating no-go areas.

Into battle. A mother llama, followed by two of her young, canter across the screen. The horizontally scrolling backdrops include Inca and Egyptian cities, a lunar colony and a rock music world.

You control mother llama. When she jumps, so do her babes — in fact, they copy her every move. The llama family is

defended by means of a Killdroid, a moving sphere.

Holding down the fire button on your joystick takes control of the hovering Killdroid (the llamas still keep on moving). Forcing the sphere into contact with any of the aliens that come swooping down on your four-legged friends kills them.

Sound and graphics are first class and the game large and fairly complex. But it all seemed pretty much of a muchness — when you've seen one llama, you've seen them all.

Bob Chappell

Rating 6/10
Price £7.50
Publisher Llamasoft 07356-4478

BEYOND

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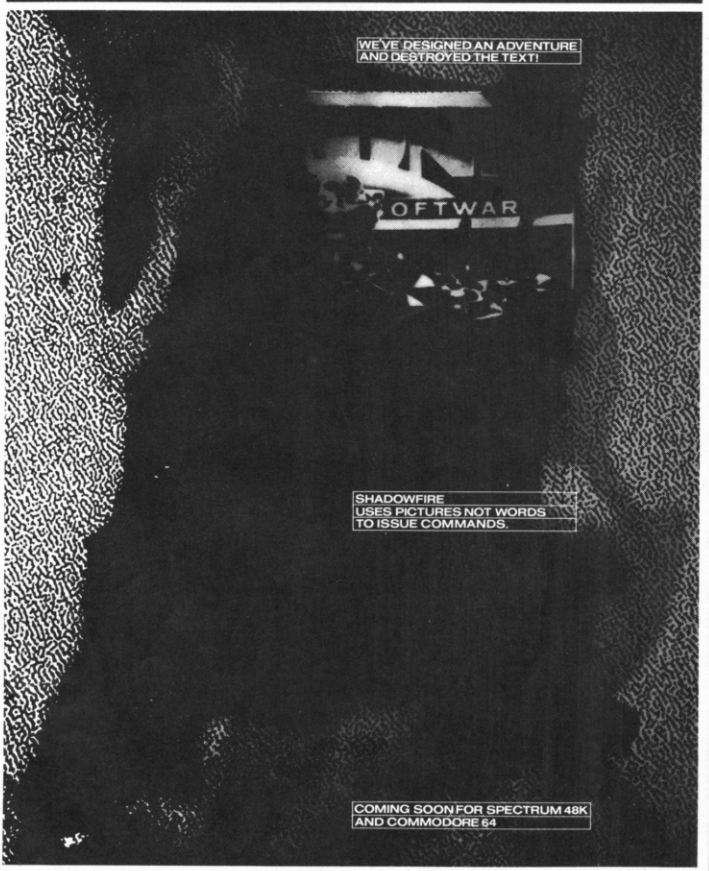

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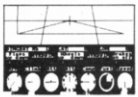
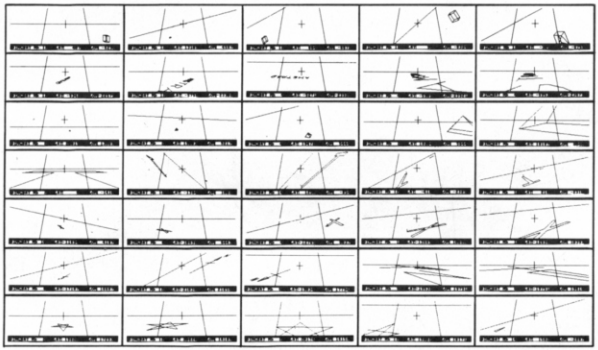


FULL SCREEN DISPLAY

Here are some screens from a typical flight showing the view from the cockpit (top half of screen) produced as printouts of the actual simulator.



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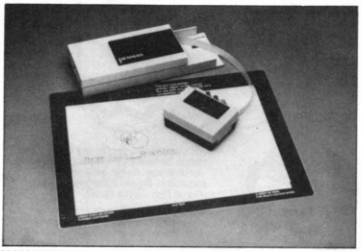
The editor's decision is final; no correspondence will be entered into. The competition is not open to employees of VNU Business Publications, Quickset or Chase Web Offset.



1 Who formulated the Three Laws of Robotics?.....

.....

2 Which saga features Marvin the Paranoid Android? .....

.....

3 Which two robots stole the show from Mark Hammil and Harrison Ford? .....

.....

4 Name Doctor Who's robotic 'best friend'.....

.....

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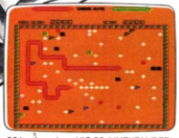

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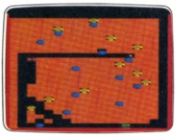

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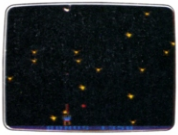

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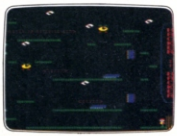

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BETTER BASIC

After a disappointing first version of Basic for the Mac, Microsoft bounces back with an excellent version 2.0. A Basic improvement, says Bryan Skinner.

Microsoft and Basic — the two words are inextricably linked in the minds of micro users. Microsoft has licensed its product to so many OEMs that a version of MBasic is the first programming language for thousands of hackers. Yet Basic is often criticised for its slowness and lack of structure.

When the Macintosh appeared it looked the perfect machine for a highly developed Basic, but Microsoft's Basic version 1.0 was a disappointment. Sure, you could make calls to the Mac's ROM routines for drawing circles, arcs, rectangles, and it was fast — which you'd expect from any application running on a 68000 — but otherwise it was pretty ordinary.

Features

Now version 2.0 is available, and what an eye-opener: it's easily the best Basic I've ever used. What makes it so different? For a start, line numbers are optional and you can GOTO a label. Version 2.0 supports event interruption, there's ON TIMER, which can be passed intervals between 1 and 86400 seconds (24 hrs); ON MOUSE for mouse button presses and ON MENU for user-menu selections. Also included are ON DIALOG and MENU definitions — yes, you can program all that window stuff with the greatest of ease. Similarly, there are fistfuls of button, mouse, window and other WIMPish instructions.

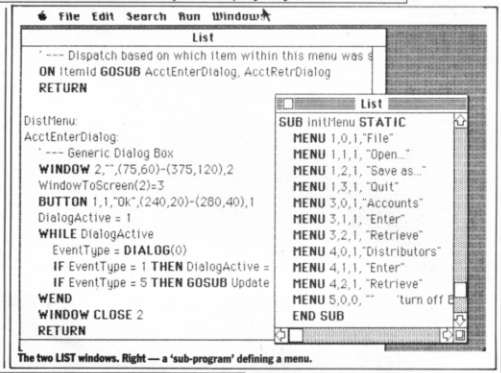
You can write professional-looking programs without resorting to lengthy and complex code. For example, I wanted to write a program to send an ASCII text file from disk to one of the serial ports, for downloading to a lap portable. With most Basics you'd have to get the user to enter the file name, and include error traps for 'File not found' problems.

With Basic 2.0 you simply use 'afile$= FILES$(1)'. When the program hits this a window appears containing all the files on disk (in alphabetical order, what's more). There's a scroll bar so you can easily get the file you want in the window. If the file you want isn't on the current disk there's an EJECT button to be clicked. When your file appears, just move the cursor anywhere over its name, click the mouse button, then the OPEN box, and control passes back to the program with the name of the selected file in the variable 'afile$'. It's that easy — just one assignment statement does what would otherwise require detailed system knowledge and a long piece of code.

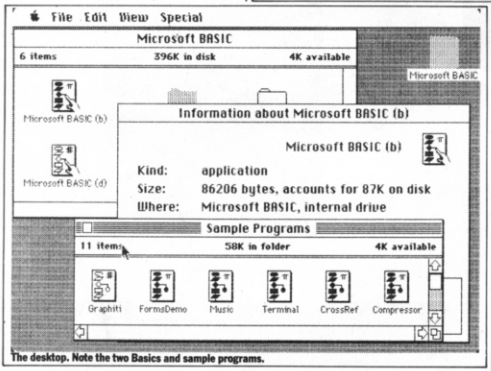
Procedures are also catered for, defined by SUB and END SUB. Parameter passing allows variables to be *static* or *shared*, *ie* local and global. Version 2.0 retains all the fancy text/graphics stuff, such as altering text fonts and sizes, drawing circles, ovals and rectangles, and framing and filling shapes. You can store all graphics commands issued, so they can be saved in a single string — PICTURE$ — and there's even a SCROLL command for pixel scrolling of rectangles in the four basic compass headings.

With SOUND you can specify frequency, duration and volume for tones using the Mac's four voices, while WAVE lets you define tone waveforms. Would you believe the latter needs an integer array of no fewer than 256 elements? You can queue sounds and specify the phase of the waveform by stating the array element at which the definition is to begin.

of Basic 2.0. They're both about 80K, the difference being internal numeric representation. One offers BCD maths (Binary Coded Decimal — the same as Basic 1.0), the other IEEE (binary). The latter is better for engineering oriented applications and gives faster run-time



The two LIST windows. Right — a 'sub-program' defining a menu.



The desktop. Note the two Basics and sample programs.

of Basic 2.0. They're both about 80K, the difference being internal numeric representation. One offers BCD maths (Binary Coded Decimal — the same as Basic 1.0), the other IEEE (binary). The latter is better for engineering oriented applications and gives faster run-time

code, particularly for trigonometric functions.

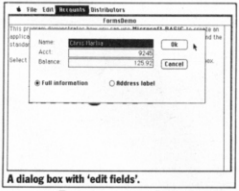
In use

Basic 2.0 isn't just one of the most powerful languages around, it's also a doddle to use. You can open two LIST windows, allowing you to operate on different sections of code at once. Unlike version 1.0, editing is within these windows, and with the mouse, cut, copy and paste facilities, makes full-screen editors look a bit Mickey Mouse. Produce an error and a LIST window appears with the offending statement framed and of course there's a full set of error messages.

Naturally, the language and its programming environment aren't flawless. There's still the tortuous LSET, RSET, MKS$, MKI$ and what have you for random access files. It's hard to see how this could be improved, and with practice they become second nature.

Basic 2.0 is fussy about spaces. I've got used to leaving them out to save RAM on the portable, and when I uploaded a program I spent ages inserting spaces between reserved words and variables. It's the price for being allowed to embed reserved words in variable names. However, since the editor puts reserved words in bold type, spotting problems is easy.

One major oversight is that when you OPEN COM1: or LPT: for interfacing you can't specify X-ON/X-OFF or SHIFT IN/SHIFT OUT, which means you'd have to handle these protocols as part of your own I/O routines, or work at the rather slow rate of 300 baud. On the plus side, you can open the clipboard for I/O, which allows you to transport data between Basic and other applications such as Multiplan.



A dialog box with 'edit fields'.

Documentation

The documentation is typical Microsoft, well-written, but rather short on worked examples. What samples of code there are tend to be duplicated, so you have the same fragments to explain two or three reserved words.

This is off-set by several sample files, ranging from a simple ellipse drawing program to a handy serial port setter to an extremely useful cross-referencer. The latter checks a program for such errors as duplicate labels — very nice. But searching for text in a large file can be slow when the system has to perform a lot of disk accessing.

Verdict

All in all Basic 2.0 for the Macintosh is as near perfect as you could wish. It's got every facility I've seen in any version, plus a whole lot more. To top that, it provides a sophisticated programming environment.

The package points the way to future Basics and I bet the Commodore, Atari and other 'super' micros won't offer anything near it.

Mac owners should seriously consider buying Basic 2.0, if only to see what the best version of the language looks like. Whether you're familiar with Basic, or a novice to programming, you'll be staggered by its power and ease of use.

REPORT CARD: 1 TO 5

Features	●●●●●
Documentation	●●●●●
Performance	●●●●●
Overall value	●●●●●

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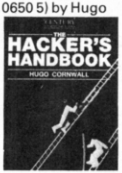


FORTH BRIDGE

The multi-lingual QL has gained another Forth compiler. Roger Thomas thinks that this implementation of Forth '83 is particularly good value though it isn't recommended for novices.

Despite being just over a year old, there's still precious little software available for the QL. The exceptions are assemblers and languages. One of the latest language packages for the QL is Forth from Computer One.

Features

The Forth compiler comes with a line editor and a 68000 micro-assembler, both of which are overlays to be loaded when needed.

The assembler is supplied so you can write Forth 'words' in machine code, increasing the speed at which programs run.

To go with the two main overlays there's a source file and an overlay to copy files. This is a useful aid as it cuts out the need to return to Basic. The source file contains the error messages and a small number of extensions to the Forth system, one of which is a decompiler so you can look at compiled code.

The other main extensions are sine/cosine functions and a string input routine. A simple game is also included which, while not up to arcade standard, allows you to play with Forth to see how programs are constructed.

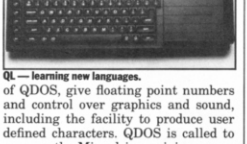
In use

Forth is booted into the computer when you switch on, in the same way as the bundled Psion programs. After the default file has been loaded you enter the interpreter, which allows you to enter Forth words to be executed immediately. For example, the word 'words' has the same effect as 'vlist', found in older implementations of Forth.

To load the editor, type edit and wait about 12 seconds for the overlay to load. Once it's loaded, full programs may be written and edited on screens of 16 rows by 64 columns. If the program is too large for one screen, you can move onto the next screen. To aid in the editing of a screen there are 35 control codes (which may be displayed by pressing F1) which makes the editor much easier to use than the standard Forth line editor.

The assembler is the last of the main programs supplied in the package and is loaded by typing asm. To enter large programs you have to use the editor. The resulting instructions are added to the Forth dictionary, and you can use the new instructions like any other 'word' in the dictionary.

As well as the standard Forth vocabulary there are a number of useful extra words specific to the QL. They make use



QL — learning new languages.

of QDOS, give floating point numbers and control over graphics and sound, including the facility to produce user defined characters. QDOS is called to manage the Microdrives, giving access to random as well as sequential file handling.

The file handling interface is designed by Laboratory Microsystems of Southampton and comprises a control area and a 128 byte data buffer. As the filing interface calls QDOS, any new hardware which works with SuperBasic should also work with Forth.

The other important specification of the package is the multi-tasker which will support up to ten background and one foreground task. The multi-tasker is very simple and gives control to background tasks in a round-robin manner. The main limitation is that background tasks must be completed before control is passed back to the foreground task.

In terms of speed Forth gives speed increases of between two and 50 times SuperBasic, with an average of about 11 times. Even calling QDOS you can expect an increase of three times or more. The word definition below does a simple loop of 1 to 32000.

```
: TEST 32000 1 DO I DROP LOOP ;
```

In Forth, this loop takes 2.8sec while a FOR-NEXT loop in Basic of the same size takes 61 sec. Forth programs may be made even faster if some of the words are defined in machine code using the assembler.

A pocket history

Forth was designed by Charles Moore in the late '60s to control radio telescopes. Since then a number of standards have been produced, the best known being Forth 79, Fig-Forth and Forth 83. QL Forth is based on the latest (and most powerful) version, Forth 83.

The features which give Forth its character are its stack and dictionary. The stack is used for all calculations. Expressions are written in such a way that the information is placed onto the stack before being manipulated. This is called reverse Polish notation (RPN). For example, 1 1 + is used instead of 1+1 and 4*7+3/(2+8) would be written as 2 8 + 3 / 4 7 * +. As you can see, parentheses aren't used and no time is wasted working out what part of the expression is to be evaluated next.

The dictionary stores the keywords, variables, functions and operators. These are called words and the list may be extended by adding new words. The dictionary may be split into parts (vocabularies) so that the same word can have different definitions in different vocabularies.

Documentation

The documentation comprises a 70 page A5 manual which gives information on all the words and overlays available to the user. The information is set out in a logical manner, different types of words being grouped together and listed alphabetically. Other sections give an introduction to the programs and there's a brief chapter on Forth. Unfortunately, the manual lacks detail on the extensions and the more powerful (and useful) Forth words provided.

Verdict

The only problem I've found is that there is no Break key — if a program crashes you have to reset the computer and start again. The manual is the main let-down, as some aspects like the Forth extensions aren't adequately explained, but anyone with a working knowledge of Forth should be able to cope.

Overall, this package is very good value for money. Other languages for the QL cost £60 or more. It becomes even better value when you realise that it's based upon the Forth 83 sold by Microprocessor Engineering, which costs £190 (though that company also offers a version of Forth 83 for the QL for £29.95).

REPORT CARD: 1 TO 5

Features	●●●●●
Documentation	●●●
Performance	●●●●
Overall value	●●●●

Name QL Forth **Application** Programming language **Price** £29.95 **Publisher** Computer One, Science Park, Milton Road, Cambridge CB4 4BH. **Other versions** None **Format** Microdrive cartridge **Outlets** Mail order.

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QUIT

When a computer company goes into receivership, liquidation, or any other state covered by a long word with a sinister sound, there are usually frantic efforts to find a rescuer.

Time isn't on the side of the stricken company. As time passes, any reputation the company might have had is forgotten and any prospects of its being successfully revived dwindle. Time, in these cases, is not a great healer.

Two months have now passed since alas poor Oric's knees were unstrung. Are the interested parties hoping that its reputation will be forgotten?

Over the Channel, where rumours home in on a possible purchaser, the micro scene was shocked last week by the resignation of a man with an unpronounceable long name over an issue close to British hearts. Monsieur Jean-Jacques Servan-Schreiber quit the Paris-based World Computer Centre to register his protest against the French Government's decision to favour native micro manufacturers. It wants to keep Apples et al out of its schools and colleges. Jean-Jacques could turn out to be the first French whinging Pomme.

But IBM France is doing its best to relieve the gloom. A recent advertising campaign (produced by Saatchi et Saatchi) included a card that played tunes and flashed green and red lights. This was given away inside a four-page insert in a magazine called Le Point; it was intended as a one-off, but other IBM sections are reported to have shown interest in the stunt. Is the world's most serious company growing frivolous? Or was the card a trial-marketing of the rumoured PC 2?

There isn't any known way of getting to the bottom of this kind of mystery. IBM (in France and elsewhere) is rumoured to be on le point of launching a lap-held, code named Clamshell. Not many first time users want a clamshell on their laps, but the name reflects IBM's attitude to so far unlaunched products.

The PC 2, expected to be an advance on the PC but not so much as to merit the suffix AT (advanced technology), is due soon. The name is, of course, a code. If IBM maintains the lead given it by the French subsidiary the successor it might settle on will be the CID, or even the Flic.

Meanwhile a semi-blank piece of paper arrives from The Program Bureau, allegedly a newly-launched software house, which claims not to conform, and has a certain originality of style.

Despite the claimed non-conformist nature of the outfit, however, the sheet — marked 'News' (there isn't much yet) — says the company is 'promising new ideas' (don't they all?) and tells us to 'look to early April' (which is what they all say, until they tell us it won't be finished till May).

Far be it from *PCN* to knock a good idea out of spite. Eclipse Software wasn't to know that the hand-out it sent to tell us about its Letaset software might cause offence.

Letaset, for the Spectrum, is intended to give you 18 character sets — 'a lettering style for every occasion', it announces proudly. To illustrate the point it includes a sample of printout that happens to sing the praises of another home computer mag, not too modest to call itself 'popular'. 'Get it today!!!' the sample trumpets.

We're not so small-minded as to knock Letaset for a minor lapse of diplomatic protocol. But it's odd that Eclipse uses a typewriter to produce its press hand-outs, when it has all those lettering styles available . . .

SYNTAX ERRORS

Issue 103's Spectrum RS232 screen dump program was wrongly credited to Marcus Gibbs. It was in fact written by Lincoln Tomlin, to whom profuse apologies.

In our report on the imminent return to these shores of the Dragon 64 (issue 104) we referred to the revamped version as the D200. It should have read 'D100' — the D200 will be the 128K model expected later in the year.

NEXT WEEK

Printer bonanza
Hard up for hard copy? Turn to our buyers guide for a walk-through view of the best printers on the market. Sub-divided by type, speed, cost and capability, the special supplement will help you make a choice.

Parallel lines
In Workbench we turn to the thorny problem of Commodore output. Follow our instructions to produce your own parallel interface.

Dragon fly
The 6809 Show in London last weekend was due to mark the return to the UK of the Dragon 64 under the banner of Compusense — read our report.

Comms tricks
We kick off a new regular column looking at the world of communications — what you'll need, where you should look, and what you can expect to find.

Easter teaser
As usual this column is headed Next Week, but prepare yourself for a shock — we won't be publishing in Easter week.

PCN DATELINES

Event	Dates	Venue	Organisers
London Festival of Computing The London Computer Fair	April 9-20 April 18-20	Various Central Hall, Westminster	Contact Jim Lagden, 01-240 8206 Patricia Spilsbury 01-303 8849 Prestel page No. 81018
Computer Assisted Learning Exhbn	April 11-13	East Midlands Conference Centre, Nottingham	Dr Phillips, Shell Centre for Mathematical Education, Univ of Nottingham, Notts NG7 2RD
Info/Comm Europe	April 14-18	Milan, Italy	Cahners Exhibitions, 01-891 5051
Saudicomputer 85 — Second Computer and Computer Graphics Show (Trade)	April 14-18	Riyadh Exhibition Centre, Saudi Arabia	Brendan Jennings, OES, 01-486 1951
Northern Computer Show (Trade)	April 16-18	Belle Vue, Manchester	Reed Exhbns 01-643 8040
INFORMAT	April 16-20	Barcelona, Spain	Feria de Barcelona, Av Reina Ma Cristina, 08004, Barcelona
TI99/4a Exchange (UK TI User Group)	April 28	Royal Pavilion, Brighton	Clive Scally, 0273-503968 after 7.30pm
Computer Aided Production Management Exhibition	April 30-May 2	Wembley Conference Centre	David Houchin, 01-579 9411
Apple 85	May 9-11	Novatel Complex, Hammersmith, London	Pamela Goodwin, 061-480 7863
Electron and BBC Micro User Show	May 9-12	New Horticultural Hall, London	Database Publications, 061-456 8383

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